

# OIL SHALE RESOURCES IN COLORADO, UTAH AND WYOMING

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Bureau of Land Management  
Library  
Bldg. 50, Denver Federal Center  
Denver, CO 80225



# United States Department of the Interior

BUREAU OF LAND MANAGEMENT

*The shale development saga has always been riddled with starts and stops, forward marches and backward retreats. And, in 1982, this continues to weave through the shale story.*

**SHALE COUNTRY  
1982**

*August 1982*

**BOOM OR BUST.** That's the way most people relate to the oil shale resource. Efforts to develop oil shale have fluctuated greatly over the past 65 years.

The 25,000 square mile Green River Formation in northwestern Colorado, northeastern Utah, and southwestern Wyoming contains oil shale with a total estimated potential of almost two trillion barrels. Approximately 83 percent of the formation is in Colorado, 9 percent in Utah, and 8 percent in Wyoming. Roughly 80 percent of this oil shale is on Federal land. The other 20 percent is under private, state, or Indian ownership.

To this point oil shale leasing has been limited to two prototype sales, two tracts each in Colorado and Utah. Some production has occurred from the tracts in Colorado.

Anticipating that eventually oil shale will be economically competitive with other forms of energy, BLM wants to be prepared for orderly development of the resource. Many issues must be addressed, clarified, and agreed upon during this preparation.

Obviously a new and fresh approach is needed.

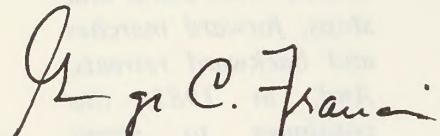
The wise investment of our time now in developing an oil shale program and regulations will return many dividends if we are ready to move ahead in an orderly and timely manner when and if the need for oil shale development is demonstrated.

To encourage you to participate, and have input throughout the various management decisionmaking actions, we have assembled the accompanying packet. These fact sheets are intended to give you some very basic and useful information - not to limit or discourage you from further research.

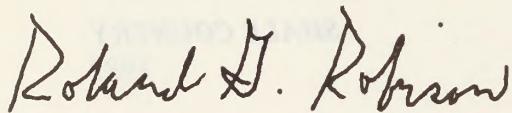
We urge you to keep this packet and let us know what items or topics you feel are missing. No doubt, we will be adding and/or revising as we move through the environmental analyses and land use planning phases of the oil shale management program.

The flyer included is self explanatory and for your convenience. In the event you want to share with a neighbor, friend, associate, etc., please do.

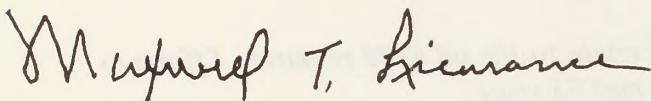
Sincerely yours,



GEORGE C. FRANCIS  
Colorado State Director



ROLAND G. ROBISON  
Utah State Director



MAXWELL T. LIEURANCE  
Wyoming State Director

In oil shale development, as well as in other synthetic fuel fields, a good many of the larger corporations have pulled in their horns. This reduced activity leads many to believe that government should not prepare for a permanent shale leasing program, or even to look to the future when oil shale may be economically feasible.

I personally feel this would be the wrong way to go. This hiatus gives us a chance to assess environmental and social impacts; to formulate rules and regulations; to look at past mistakes; and to assure that we do have an oil shale program in place if we face the type of cut-off from foreign energy sources that brought this country to near-panic in 1973.

Barring a miraculous breakthrough of technology in solar, nuclear, or yet-undiscovered energy forms, oil shale is certain to become a feasible future energy source.

ROBERT F. BURFORD  
Director, BLM

U.S. Department of the Interior - Bureau of Land Management  
Colorado                      Utah                      Wyoming

**ORDER FORM**

For additional information on local land use planning and/or oil shale efforts, or to be included on mailing list, write your nearest BLM office. (addresses on back of your folder)

Please PRINT all information

#### ORGANIZATION

NAME & TITLE

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

For additional copies of fact sheets or to be included on regional mailing list  
write: Colorado State Office

Oil Shale Program Manager  
1037 20th Street  
Denver, CO 80202

#### ORGANIZATION

NAME & TITLE

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

Include me on your regional mailing list

### **Available Oil Shale fact sheets:**

- ( ) Folder
  - ( ) Order Form
  - ( ) Index
  - ( ) 1. What is Oil Shale?
  - ( ) 2. History of Oil Shale
  - ( ) 3. Legislation and Regulations
  - ( ) 4. Oil Shale Mining Claims
  - ( ) 5. Who's Who in Oil Shale
  - ( ) 6. Current General Status of Oil Shale and Specific Projects in Colorado, Utah, and Wyoming
  - ( ) 7. Prototype Environmental Impact Statement (Colorado)
  - ( ) 8. Programmatic Environmental Impact Statement
  - ( ) 9. Land Use Planning and Oil Shale General Background and Process
  - ( ) 10. Land Use Plans in Colorado
  - ( ) 11. Land Use Plans in Utah
  - ( ) 12. Land Use Plans in Wyoming
  - ( ) 13. Chevron EIS - Private Oil Shale (Colorado)
  - ( ) 14. Uintah Basin Synfuels - Private Oil Shale (Utah)
  - ( ) 15. Mobil-Pacific Oil Shale - Private Oil Shale (Colorado) Available 11/82
  - ( ) 16. Tar Sand Environmental Impact Statement
  - ( ) 17. Schedule for Oil Shale Activities
  - ( ) 18. Glossary

Comments or suggestions for improving or correcting this oil shale resources informational packet and accompanying fact sheets:

#### Suggestions for additional fact sheets:





# PUBLIC LANDS RESOURCES

## FACT SHEET

## OIL SHALE

### I N D E X

<u>Fact Sheet</u>	Bureau of Land Management Library Bldg. 50, Denver Federal Center Denver, CO 80225	<u>Original Issue Date</u>	<u>Latest Revised Date</u>
1. What is Oil Shale?	8-82	--	
2. History of Oil Shale	8-82	9-82	
3. Legislation and Regulations	8-82	9-82	
4. Oil Shale Mining Claims	8-82	9-82	
5. Who's Who in Oil Shale	8-82	9-82	
6. Current General Status of Oil Shale Activities and Specific Projects in Colorado, Utah, and Wyoming	8-82	9-82	
7. Prototype Environmental Impact Statement (Colorado)	8-82	9-82	
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13. Chevron EIS - Private Oil Shale (Colorado)	8-82	--	
14. Uintah Basin Synfuels Development EIS - Private Oil Shale (Utah)	8-82	9-82	
15. Mobil-Pacific Oil Shale - Private Oil Shale (Colorado)	Available 11-82		
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# PUBLIC LANDS RESOURCES

## FACT SHEET 1

## OIL SHALE

### WHAT IS OIL SHALE?

Oil shales contain probably the world's greatest hydrocarbon energy resource equivalent to some 342 trillion barrels of oil. Potentially exploitable oil shale resources are found in 38 countries. North America contains approximately 15 percent of the world's oil shale resources.

The richest domestic oil shales underlie some 25,000 square miles of the tri-corner region of Colorado, Utah, and Wyoming in six resource basins. High grade oil shales in this region (more than 25 gallons per ton) could yield oil nearly equivalent to total estimated world crude oil reserves (642 billion barrels). Nearly 72 percent of this resource area contains 80 percent of the high-grade shales that is federally administered.

Green River Formation oil shales are neither a true shale nor do they contain oil. Technically they are a stratified, fine-grained, sedimentary marlstone comprised of approximately 86 percent inorganic material (principally carbonates) and 14 percent solid organic material (kerogen). Kerogen breaks down into oils and gases when it is heated (pyrolyzed) to about 900° F by a process called retorting. A carbon residue remains that can be burned to provide process heat.

Kerogen was formed from the remains of aquatic organisms, algae, and pollen that settled to the bottom of ancient lakes that once inundated the tri-state region some 50 to 60 million years ago during Eocene times.

Associated with the Green River Formation oil shales, particularly in Colorado, are vast quantities of potentially valuable sodium minerals including: 29 billion tons of nahcolite, a potential source of industrial scrubbing agents that helps remove sulfur from coal fired power plant stock gases as well as other uses; and 19 billion tons of dawsonite, a potential source of alumina also associated with the oil shales in Colorado. There is also 64 billion tons of trona, a source of soda ash in Wyoming.

Shale oil can be produced from oil shale by three major methods: 1) direct mining and retorting on the surface, 2) in-situ production, or 3) a combination of these methods. Oil shale can be mined by underground methods such as room-and-pillar or caving techniques, or by other methods i.e. open pit, surface mining where the overburden is less than 1,000 feet thick.

Mined shale is rubblized and crushed and then heated inside a retort, either by direct-heated methods where pyrolysis temperature is provided by combustion or

carbon residue left over from prior retorting of shale oil within the retort, or by indirect heated methods where a solid or gaseous material is heated outside the retort and then mixed with the raw shale.

Shale oil can also be produced in the ground with in-situ methods by rubblizing the oil shale strata and dissolving away minerals associated with the shale and then either burning or circulating a heated material through the rubblized shale drawing the oil and gas off through wells. Direct mining and in-situ methods can be combined in a process called modified in-situ wherein a portion of the oil shale strata is mined out and retorted on the surface and the remaining shale is caved or explosively rubblized into the mine voids and retorted by direct or indirect heating underground.



# PUBLIC LANDS RESOURCES

## FACT SHEET 2

## OIL SHALE

### HISTORY OF OIL SHALE

The idea of extracting oil from oil shale is not new. People have long been aware of its characteristics and values. Hydrocarbons have been recovered from shales containing kerogen for at least 600 years. Pioneers in the western United States who learned from the Ute Indians of "the rock that burns" fueled their campfires with shale and used its oily residue to grease their wagon axles. Numerous industries of commercial size have existed in various countries since the early 1800's.

In the United States, the periodic spurts of interest in development of oil shale--most particularly those in the Green River Formation--have been closely tied to perceptions, true or false, that the country's conventional oil supplies were dwindling, or that there was not enough conventional oil to supply domestic or military needs.

In the 1850's small amounts of shale oil were produced in the eastern U.S. However, lack of technology, prohibitive costs in processing oil shale, and inexpensive and apparently reliable foreign crude supplies stalled efforts to produce an economical and viable fuel source.

In 1859, the first successful crude oil well was drilled in Titusville, Pennsylvania and interest in oil shale development diminished.

In 1915, there were reports that the automobile and other domestic needs would create excessive demands on the known petroleum reserves, and there was a flurry of activity related to the development of oil shale.

By 1929, a total of 3,600 barrels of oil was extracted from Rulison, Colorado. That ended when oil fields were discovered in Texas and Oklahoma. Again, due to economics, oil shale was relegated to the back burner.

During World War II, as U.S. war machines consumed hundreds of thousands of barrels of oil, supply problems mounted, and once again the interest in developing the vast oil shale deposits of the western U.S. was renewed. That interest and post-war shortages led to passage, in 1944, of the Synthetic Liquid Fuels Act, the creation of an oil shale program in the U.S. Bureau of Mines, and establishment

of an experimental station at Anvil Points on the Naval Oil Shale Reserve site near Rifle, Colorado. That marked the beginning of development of large scale methods for domestic shale oil production.

With the end of World War II, the discovery of huge Middle East oil fields, and the advent of the Nuclear Age, concern about oil supplies diminished once again as did the widespread interest in oil shale.

Through the 1950's and into the 1960's, limited research programs continued, but interest did not start to grow again until the late 1960's. As U.S. dependence upon imported oil increased, the Department of the Interior began making plans in 1969 for a Prototype Leasing Program on rich oil shale lands it managed in Colorado, Utah and Wyoming.

Not until the Arab oil embargo of 1973, however, did the U.S. seriously consider ways to reduce dependence on unstable foreign oil supplies. At that time the Department of the Interior instituted the Prototype Oil Shale Leasing Program to accomplish four main objectives: 1) to provide a new source of energy to the nation by stimulating the development of commercial oil shale technology by private industry, 2) to ensure the environmental integrity of the effected areas and to incorporate environmental safeguards and restoration techniques into the planning of the final leasing program, 3) to permit an equitable return to all parties in the development of this public resource, and 4) to develop management expertise in the leasing and supervision of oil shale development in order to provide the basis for future administrative procedures.

During the early 1970's, an Oil Shale Task Force was established in the Department of the Interior to evaluate the prospects for oil shale development in light of the national energy situation, and to devise a limited oil shale leasing program. The intent was to involve private industry in the development of public oil shale resources and to furnish a suitable resource base to determine the economic and the environmental impacts of the oil shale industry. The final product of the task force was the Prototype Oil Shale Leasing Program of 1974.

Bids for leases on six 5,120 acre tracts (two each in Colorado - C-a & C-b, Wyoming - W-a & W-b, and Utah - U-a & U-b) were solicited by the Bureau of Land Management in 1974. Bids totaling \$449 million were received for the four Colorado and Utah tracts. No bids were received for the Wyoming tracts. To date, no commercial production has been obtained from any of these prototype leases. However, there are also many experimental projects on privately owned oil shale lands.



# PUBLIC LANDS RESOURCES

## FACT SHEET 3

## OIL SHALE

### LEGISLATION AND REGULATIONS

Laws: (Current) statutes relating to Oil Shale

#### 1. The General Mining Law of 1872 (30 U.S.C. § 21 et seq.)

This law allows citizens to acquire title to public land and/or the mineral resources they contain if it can be shown that a valuable mineral deposit has been found. It also requires the performance of \$100 worth of assessment work (development work) each year.

In accordance to this law, thousands of oil shale mining claims were located. It is estimated that location notices for over 30,000 such claims were recorded in various counties in the States of Colorado, Utah, and Wyoming. Some of the mining claims, covering about 300,000 acres of land, were patented, i.e., transferred from Federal to private ownership. Many of the claims were abandoned.

By passing the Mineral Leasing Act of February 25, 1920, Congress removed oil shale from the list of minerals subject to this 1872 law.

#### 2. The Mineral Leasing Act of February 25, 1920 (30 U.S.C. § 181 et seq.)

Under the terms of this Act, the Secretary of the Interior is authorized to lease deposits of oil shale and lands containing such deposits for an indefinite period of time under such terms and conditions as he finds are in the public interest. An oil shale lessee must pay a royalty on production and an annual rental for the land leased.

Excepted from the terms of the Act are oil shale mining claims which were valid as of 1920, or validated as a result of work in progress at that time and thereafter diligently pursued, and which have been maintained as required by the 1872 mining law, including the performance of assessment work.

The 1920 Act authorizes the Secretary to issue leases of up to 5,120 acres in size and any one person is entitled to hold only one lease.

3. The Multiple Mineral Development Act of August 13, 1954  
(30 U.S.C. § 521 et seq.)

Among other things, this Act provides a procedure for resolving conflicts between mining claimants and lessees of the minerals listed in the 1920 Mineral Leasing Act. Under the terms of this Act, a lessee may require owners of unpatented mining claims to file "verified statements" setting forth the nature of the interest asserted by the mining claimant. If he elects, the lessee may demand that the mining claimant prove the validity of his claim in an administrative hearing.

4. The National Environmental Policy Act of 1969 (42 U.S.C. § 4321 et seq.)

This Act requires the Secretary of the Interior to evaluate decisions relating to oil shale leasing to determine the effects on the environment by a proposed oil shale development on public lands. Appropriate reports discussing potential effects must be prepared.

5. The Federal Land Policy Management Act of 1976 (43 U.S.C. § 1701 et seq.)

This Act sets forth procedures to be followed in deciding whether to issue oil shale leases, such as land use and resource management planning, as well as possible exchanges of public oil shale resources for private oil shale resources. It also provides the formula for distributing revenues received from the leasing of oil shale deposits. The Act provides the authority for issuing rights-of-way and other land use authorizations that may be required to properly develop a leased oil shale deposit.

LAWS: (Pending). Several major pieces of legislation are presently being considered by the U.S. Congress. Fact sheets will summarize these laws if enacted.

For additional information regarding the associated laws, contact:

Assistant Regional Solicitor Department of the Interior P.O.  
Box 25007  
Denver Federal Center  
Denver, CO 80225  
Phone: (COM) 303-234-6781  
(FTS) 234-6781

REGULATIONS PERTAINING TO OIL SHALE

- a) Proposed regulations - October 1982
- b) Final regulations - May 31, 1983
- c) Effective date of regulations - June 30, 1983

## AUTHORITIES

- a) Mineral Leasing Act of 1920, as amended
- b) Mineral Leasing Act for Acquired Lands of 1947
- c) Federal Land Policy and Management Act of 1976
- d) National Environmental Policy Act of 1969

NOTE: The oil shale regulations will be made available to the public approximately October 1982. At that time a fact sheet summarizing them will also be made available.

For more information regarding Permanent Oil Shale Program Regulations contact:

Donald Brabson  
Bureau of Land Management  
18th & C Streets, N.W.  
Branch of Tar Sand and Oil Shale (540)  
Washington, D.C. 20240  
Phone: (COM) 202-343-3258  
(FTS) 343-3258





# PUBLIC LANDS RESOURCES

## FACT SHEET 4

## OIL SHALE

### OIL SHALE MINING CLAIMS

An oil shale mining claim is a right to explore for, develop, and remove mineral deposits on public land under provisions of the Mining Law of 1872, as amended.

The question is often asked, "How do mining claims relate to the oil shale leasing program?" They relate only in connection with the matter of resource availability. Because of the claims, certain lands may not be available for Federal leasing, depending whether prior claims are found to be valid. Other lands containing deposits of oil shale are not available for Federal leasing because they have already been patented to the claimants and are privately owned.

Thousands of oil shale mining claims were located under the Mining Law of 1872 and prior to the passage of the Mineral Leasing Act of 1920. Under the Federal Land Policy and Management Act, 2,260 claims have been recorded (1,186 in Colorado, 732 in Utah, and 342 in Wyoming). Of the total, 543 claims in Colorado are included in applications for patent. The status of these applications is as follows: (a) 9 claims are involved in mineral entry cases in litigation in a ruling by the U.S. Supreme Court; (b) 25 claims are involved in mineral entry cases awaiting appeal in the U.S. District Court for Colorado; (c) 202 claims are involved in mineral entry cases under U.S. District of Colorado Court Order of January 27, 1981, and now awaiting decision of the Administrative Law Judge (IBLA); (d) 168 claims are involved in mineral entry cases under U.S. District of Colorado Court Order of May 8, 1981, for field examination; and (e) 139 claims are involved in mineral entry cases awaiting adjudication in BLM. There will be 132 claims examined under contract.

Presently a large portion of the claims in Colorado are under litigation. The litigation involves whether or not there is an exposure of a prospectively valuable oil shale deposit within the boundaries of the claim and, if so, when that exposure was made or found. It also involves the question of whether the claimants have "maintained" their claims, as required by the 1872 Mining Law.





# PUBLIC LANDS RESOURCES

## FACT SHEET 5

## OIL SHALE

### WHO'S WHO IN OIL SHALE

#### FEDERAL GOVERNMENT

##### U.S. Department of the Interior

Manages and administers over 500 million acres of Federal land and has entrusted responsibility for approximately 50 million acres. Jurisdiction for the conservation, development, and utilization of mineral, water, recreation, and fish and wildlife resources. It is comprised of the following agencies: Bureau of Indian Affairs, Bureau of Land Management, Bureau of Mines, Bureau of Reclamation, U.S Fish and Wildlife Service, Geological Survey, Minerals Management Service, National Park Service, and Office of Surface Mining.

Secretary of the Interior - Head of an executive department, reports directly to the President, and is responsible for the direction and supervision of all operations and activities of the Department of the Interior.

Bureau of Land Management - An agency of the Department of the Interior. Manages 52 percent of the country's Federal lands and administers the Federal laws pertaining to these lands, including those relating to resources such as oil shale.

Solicitor's Office - Provides advice to the Secretary of Interior, Director of BLM, and State Directors of BLM regarding legal problems concerning leasing of lands for oil shale development and making available lands for needed rights-of-way and other supporting facilities. Also provides advice regarding adjudication of existing oil shale mining claims. Regional Solicitor, Bldg. 67, Denver Federal Center, Denver, CO 80225.

#### Washington Offices:

Director of the Bureau of Land Management - Formulates Bureau policy within limits delegated by the Secretary of the Interior and Assistant Secretary, Land and Water Resources. Directs all activities of the Bureau, and renders final decisions.

Deputy Director for Energy and Mineral Resources - The line management official with program authority for all energy and minerals programs within the BLM. Establishes policy, resolves issues, and provides policy direction for matters within assigned program areas. On matters under his/her direction, provides substantive direction for all budget, program development, and policy analysis activities.

Assistant Director, Energy Resources - Responsible for developing and implementing policy and programs for the management of energy minerals (including oil shale) administered by the BLM. Chairman for the Regional Oil Shale Team.

Division of Coal, Tar Sand, and Oil Shale - Responsible for the development, implementation, evaluation, and management of the Bureau's coal, tar sands, and oil shale leasing programs. The division develops policies, systems, procedures and regulations.

#### Field Offices:

State Directors for Colorado, Utah, and Wyoming - Principal Bureau line official at the field level and is directly accountable to the Director of the Bureau of Land Management. Formulates oil shale policy within units delegated by the Director, directs activities within the State, and renders decisions. Will concur with the Resource Management Plans and sign appropriate environmental impact statements that involve oil shale within their respective State.

Oil Shale Program Manager - Represents BLM in Colorado, Utah and Wyoming to manage, give direction, and coordinate all aspects of the Federal oil shale program. In Colorado, acts for the Colorado State Director in all matters regarding the development of federally owned oil shale. Develops and interprets policy for application to the oil shale program for Colorado, Utah, and Wyoming. Provides field lead in interagency coordination, including the Regional Oil Shale Team.

Division of Resources - Develops and interprets oil shale program policy for the respective State Director. Establishes long range program direction. Provides technical guidance to all field locations as well as procedural program guidance, including quality control in aspects of land-use planning and National Environmental Protection Act (NEPA) compliance. In addition, may conduct or contract special studies relating to shale development. Also examines oil shale mining claims and determines program priorities.

District Manager - Principal line officer at the district level and is directly accountable to the Director and State Director. Formulates policy within limits delegated by the State Director, directs activities within the district, and renders decisions. The district office provides oversight, guidance, and support to the resource area with goals developed by the State Director. They sign all Resource Management Plans and make recommendations on environmental impact statements within their district to the State Director. They are generally the project manager for private oil shale initiatives (e.g., rights-of-way, reservoirs, exchanges, etc.).

Area Manager - Principal Bureau line official at the resource area level and is directly accountable to the Director, State Director, and District Manager. They carry out Bureau policies and decisions within their geographic area of responsibility, direct all activities within the resource area, and render decisions. The Resource Management Plans, most environmental assessments and environmental impact statements are prepared at the resource area level. They generally prepare the National Environmental Protection Act (NEPA) compliance for private oil shale initiatives (e.g., rights-of-way, reservoirs, etc.).

Bureau of Mines - An agency of the Department of the Interior. The Bureau performs research, provides information and enforces laws concerning the extraction, processing, use and disposal of minerals. Research Director, Denver Research Center, Denver Federal Center, Bldg. 20, Denver, CO 80225. (303) 234-3754.

Bureau of Reclamation - An agency within the U.S. Department of the Interior. Oversees the development of water and related land resources throughout the U.S., including irrigation, hydro-electric power generation, municipal and industrial water supply, outdoor recreation, and flood control. Chief, Economics and Land Resources, P.O. Box 11568, Salt Lake City, UT 84147. (801) 524-5522.

Geological Survey - An agency of the U.S. Department of the Interior. Determines mineral resources and geologic structure of the United States. Activities include exploration, mapping, and research into geologic principles and processes. Mail Stop 913, P.O. Box 25046, Denver Federal Center, Denver, CO 80225. Attention: Geologist: (303) 234-3495.

U.S. Fish & Wildlife Services - Western Energy and Land Use Team, part of the Office of Biological Services, U.S. Department of the Interior. Determines research needs relating to energy development and its effects on wildlife; does research; evaluates and disseminates information. Team Leader, Drake Creekside, Bldg. 1, 2625 Redwing Road, Fort Collins, CO 80526. (303) 226-9100.

Minerals Management Board - The Board is chaired by the Under Secretary of the Interior. Other members are Assistant Secretary, Energy and Minerals and the Assistant Secretary, Policy, Budget and Administration. The Board will supervise and oversee the operations of the Minerals Management Service.

Minerals Management Service - The functions of MMS include: evaluation and classification of Federal lands for their mineral character and value, and supervision of operations necessary to the prospecting, development, and production of minerals on Federal and Indian lands.

Minerals Management Service Oil Shale Office - Presently responsible for the supervision of operations of the prototype oil shale program--two tracts in Colorado and two in Utah. Deputy Minerals Manager - Oil Shale, 131 N. 6th, Suite 300, Grand Junction, CO 81501. (303) 245-6700.

Department of Energy - Responsible for Federal energy programs, policies, research and development; works with industry, universities, and other government agencies. Includes activities of the Federal Power Commission, Federal Energy Administration, and the Energy Research and Development Administration, as well as the energy-related activities of many other Federal agencies. Director, Office of Oil Shale and Gas, U.S. Department of Energy, Germantown, MD 20545. (301) 353-2707.

Laramie Energy Technology Center - Formerly Laramie Energy Research Center. A leader in the field of oil shale research, especially in-situ processes. Director, Laramie Energy Technology Center, P.O. Box 3395, University Station, Laramie, WY 82071. (307) 721-2011.

Naval Oil Shale Reserves - The Department of Energy administers the Naval Oil Shale Reserves in certain lands in Colorado and Utah. Cooperates with other government agencies and industry in researching methods of converting shale oil into fuel. U.S. Naval Petroleum and Oil Shale Reserves, Department of Energy, Rm. 6454, 12th & Pennsylvania Ave., N.W., Washington, D.C. 20461. Program Manager: (202) 633-8641. Legal Counsel: (202) 633-8641.

Environmental Protection Agency - Responsible for researching, monitoring and regulating pollution control and hazardous wastes (i.e., offsite spent shale disposal and water quality). Also coordinates research and antipollution enforcement activities of State and local governments, educational institutions, and individuals. Director, Management Systems & Analysis Office, Region VIII, 1860 Lincoln, Denver, CO 80295. (303) 837-2351.

Soil Conservation Service - An agency of the Department of Agriculture. Works in cooperation with local soil conservation districts to provide seeds and plants for oil shale reclamation programs. Also helped establish the Upper Colorado Environmental Plant Materials Center near Meeker, Colorado. State Resource Conservationist, U.S. Department of Agriculture, U.S. Soil Conservation Service, P.O. Box 17107, 2490 W. 26th Avenue, 3rd Floor, Denver, CO 80217. (303) 837-5651.

#### STATE AND LOCAL GOVERNMENT

Associated Governments of Northwestern Colorado - Group of local governments on Colorado's Western Slope; includes Mesa, Moffat, Rio Blanco, and Garfield counties. Formed to address regional concerns, including impacts from oil shale development, as well as to channel government funds and to avoid duplication of efforts among its members. Director, P.O. Box 351, 1400 Access Road, Rifle, CO 81650. (303) 625-1723.

Colorado Department of Health - State agency that deals with health and environmental-health regulations related to oil shale; in particular, air quality, water quality and solid waste. Chief of Stationary Sources, Air Pollution Division, 4210 E. 11th Avenue, Denver, CO 80220. (303) 320-4180.

Colorado Energy Research Institute - State agency, affiliated with Colorado School of Mines, established by the legislature to coordinate research on Colorado's energy studies. Director, 3000 Youngfield, Suite 153, Lakewood, CO 80215. (303) 232-1906.

Colorado Geological Survey - Division of Colorado Department of Natural Resources. Involved in many oil shale planning studies; also publishes reports on oil shale. Director, 715 State Centennial Building, 1313 Sherman Street, Denver, CO 80203. (303) 866-2611.

Colorado Department of Natural Resources - State agency responsible for overall policy, management and coordination of the resources under State jurisdiction. Director, 1313 Sherman Street, Room 718, Denver, CO 80203. (303) 866-3311.

Colorado Joint Review Process (CJRP) - A process developed by the State of Colorado which is a voluntarily coordinated intergovernmental review procedure for major energy and mineral resource development projects. The process works entirely within the existing framework of current laws and regulations. The process coordinates all State, local, and Federal actions. Program Director, 1313 Sherman, Room 718, Denver, CO 80203. (307) 866-3337.

Uintah Basin Assn. of Governments - Blanket planning agency for three Utah counties (Daggett, Duchesne, and Uintah). Works for intergovernmental cooperation. Director, P.O. Box 1449, Roosevelt, UT 84066. (801) 722-4518.

Uintah Basin Energy Planning Council - Represents three counties (Uintah, Daggett, and Duchesne). Council acts as State's advisor on basin energy questions. Also secures funds for energy impacts and directs oil shale development planning on request of local governments. Director, 104 Uintah County Bldg., Vernal, UT 84078. (801) 789-2300.

Utah Dept. of Community and Economic Development - State agency that coordinates socioeconomic issues related to synthetic fuel development. Director, 6290 State Office Bldg., Salt Lake City, UT 84114. (801) 533-5396.

Utah Dept. of Natural Resources and Energy - State agency that regulates and leases State lands. Director, 1636 W. North Temple, Salt Lake City, UT 84116. (801) 533-5356.

Western Interstate Energy Board (WIEB) - State agency representing 16 western States on energy, natural resources and environmental law issues. Serves in an advisory capacity to the western States' governors and legislators. Executive Director, Suite 3500, Stapleton Plaza, 3333 Quebec, Denver, CO 80207. (303) 837-5851.

Wyoming Geological Survey - Involved in surveying and studying oil shale lands. State Geologist, P.O. Box 3008, University Station, Laramie, WY 82071. (307) 742-2054.

Wyoming Industrial Siting Council - Reviews the social, economic, and environmental impacts of industrial facilities prior to issuing a permit authorizing construction. Director, 1720 Carey Avenue, Boyd Bldg., Cheyenne, WY 82002. (307) 777-7368.

Wyoming State Planning Coordinator's Office - State agency which coordinates review of land use plans in the State of Wyoming. Director, 2320 Capitol Avenue, Cheyenne, WY 82002. (307) 777-7574.

#### UNIVERSITIES

Colorado School of Mines - State-supported institution, sponsors research and the annual oil shale symposium and other seminars on oil shale. The school presently offers a special engineering program in shale oil. Director, Public Relations, Golden, CO 80401. (303) 273-3326.

Colorado State University - State university involved in oil shale research, particularly in the area of revegetation. Plant Scientists, C112, Agronomy, Colorado State University, Ft. Collins, CO 80523. (303) 491-6314. University is also involved in oil shale underground research (aquifers and leaching research). Oil Shale Research, B11, Engineering Research Center, Colorado State University, Ft. Collins, CO 80523. (303) 491-8358. University is also involved in thermophysical, electrical, and acoustical properties research. Researcher, B202, Engineering Research Center, Colorado State University, Ft. Collins, CO 80523. (303) 491-8480.

Denver Research Institute (DRI) - Branch of the University of Denver, consisting of scientists and engineers engaged in contract research for government and industry. DRI has been involved in oil shale research for more than 30 years. Director, 2050 E. Iliff, Denver, CO 80208. (303) 753-2271.

Northwest Colorado Wildlife Consortium - A joint effort by the Colorado Division of Wildlife, Colorado State University, University of Northern Colorado, and the University of Colorado to develop wildlife conservation strategies and alternatives for the energy impacted areas of northwestern Colorado. Executive Secretary, Department of Environmental Population and Organismic Biology, Campus Box 334, University of Colorado at Boulder, Boulder, CO 80309. (303) 492-8726.

Oil Shale Task Force - Coordinates the U.S. Department of Energy research in areas of health and environmental data base development and risk analysis on oil shale research and related matters. Sponsors symposia for dissemination of information on research, etc. University of Colorado at Denver, 1100 14th Street, Campus Box 136, Denver, CO 80202. (303) 629-3460.

University of Colorado - State institution that conducts research on oil shale development and impacts; also has continuing education center in Grand Junction. Director, Campus Box 433, Boulder, CO 80309. (303) 492-8211.

University of Utah - State institution; the energy research center for the State, particularly fuels, engineering and mining research. Chairman, Chemical Engineering Dept., 3062 Merrill Engineering Bldg., Salt Lake City, UT 84112. (801) 581-6915.

Utah State University - State institution; looks into water problems involved in energy development. Dean, College of Natural Resources, UMC 52, Logan, UT 84322. (801) 750-2445.

PRIVATE

These are some key companies involved with development of oil shale.

Atlantic Richfield (ARCO) - Owner of extensive oil shale lands in western Colorado; formerly one of two participants in the Colony Shale Oil Project and a former lessee of Federal Tract C-b in Colorado.

C-a - One of two federally leased prototype oil shale tracts in Colorado. (see Rio Blanco Oil Shale Co.)

C-b - One of two federally leased prototype oil shale tracts in Colorado. (see Cathedral Bluffs Shale Oil Co.)

Cathedral Bluffs Shale Oil Co. - The partnership development company for Federal tract C-b in Colorado. Lessees: Occidental Oil Shale, Inc. (Operator), and Tenneco Shale Oil Co. (partner).

Chevron Shale Oil Co. - A subsidiary of Standard Oil (California), Chevron holds the largest amount of private oil shale lands in Colorado. BLM is preparing an environmental impact statement investigating the feasibility of building a commercial project on these lands.

Colony Shale Oil Project - Exxon Corporation, Exxon Company, U.S.A. (Operator). Formed to develop oil shale on private land holdings, also known as the DOW property.

Geokinetics, Inc. - Recipient of a Program Opportunity Notice from the U.S. Dept. of Energy, for in-situ (in place) research. It is currently testing its horizontal in-situ retorting process at a field test site 70 miles south of Vernal, UT.

Getty Oil Co. - Company that owns oil shale land in Colorado's Piceance Creek Basin. Currently conducting shale lab research.

Gulf Oil Corp. - One of two lessees of Federal oil shale tract C-a in Colorado (Rio Blanco Shale Co.).

Magic Circle Energy Corp. - Operator of oil shale project on leased State land in Uintah County, Utah.

Mobil Oil Corp. - Has proposed an oil shale development in Parachute Creek drainage and related reservoir, Main Elk Creek near New Castle, CO. Bureau of Land Management will contract a third party to prepare environmental impact statement (to begin Fall 1982).

Multi Mineral Corp. - Company involved in testing methods of co-production of oil shale with dawsonite and nahcolite, associated oil shale minerals found on lands in the Piceance Creek Basin, through a cooperative agreement with the Bureau of Land Management and Bureau of Mines (Horse Draw Research Facility).

Occidental Oil Shale, Inc. - The oil shale division of Occidental Petroleum Corp., involved in private oil shale development research at its Logan Wash Operations, near DeBeque, Co., where it is investigating modified in-situ (in-place) retorting processes. Also one of two lessees of Tract C-b.

Paraho Development Corp. - Consortium of 17 companies involved with oil shale retort demonstration at the Anvil Points Oil Shale Mine and Retorting Facility on the Naval Oil Shale Reserve near Rifle, CO, and with retorting feasibility studies for eastern black shales.

Phillips Petroleum Co. - One of the companies in the White River Shale Oil Corporation, developers of Federal tracts U-a and U-b in Utah. Also holds a block of unpatented oil shale mining claims in the northwest part of the Piceance Creek Basin.

Quintana Minerals Corp. - Operator of a joint venture oil shale project with Synthetic Oil Corp. of Oklahoma City. This venture is known as Syntana-Utah Shale Oil Project. The venture is cooperating in a State/Federal land exchange program to block up a mineable unit in Utah.

Rio Blanco Oil Shale Co. - Project title. Development company representing the lessees (Gulf Oil Corp. and Standard Oil of Indiana) for the development of Federal oil shale tract C-a in Colorado.

Standard Oil of Indiana - One of two lessees of Federal oil shale tract C-a in Colorado (Rio Blanco Shale Co.).

Tenneco Shale Oil Co. - Division of Tenneco Oil Co. and one of two lessees of Federal oil shale tract C-b in Colorado.

Texaco, Inc. - A company conducting in-situ retorting field tests in Uintah County, UT.

The Superior Oil Co. - Company engaged in testing retorting and mineral recovery processes on private shale lands near Meeker, CO.

Tosco Development Corporation - A subsidiary of Tosco Corporation, is the sole proprietor of the Sand Wash Shale Oil Project in Utah. Participated in the Uintah Basin Synfuels Development EIS on a site specific basis. Tosco was a 40 percent partner in and original founder of the Colony Shale Oil Project and the recipient of a loan guarantee from DOE until the project was suspended by Exxon in May 1982. Tosco is also the owner of considerable fee oil shale acreage in the Piceance Basin and one of the largest holders of unpatented claims in Colorado.

#### OTHER

Club 20 - A western Colorado association of communities and industry dedicated to economic stability and orderly economic development through education, promotion and political action. Director, 845 Grand Avenue, Grand Junction, CO 81501. (303) 242-3264.

Colorado Mining Assn. (CMA) - Trade association composed of companies and individuals engaged in various phases of the mineral industry. Manager, 1515 Cleveland Place, Suite 410, Denver, CO 80202. (303) 534-1181.

Colorado Open Space Council (COSC) - A volunteer coalition of environmentally-concerned organizations and individuals. 2239 East Colfax Ave., Denver, CO 80206. (303) 393-0466.

Cumulative Impact Task Force (CITF) - A cooperative public/private effort, developed by State of Colorado, Department of Natural Resources and Department of Local Affairs, and principally the oil shale industry representatives and Bureau of Land Management to project the population and fiscal impacts of energy development in northwestern Colorado. Assistant Director, Colorado Department of Natural Resources, 1313 Sherman Street, Room 718, Denver, CO 80203. (303) 866-3311.

Friends of the Earth (FOE) - An organization which advocates conservation--politically, legislatively, and in the courts of law in the U.S. Director, 2239 East Colfax, Denver, CO 80206. (303) 399-2288.

Lawrence Livermore Laboratories (LLL) - Laboratory managed by the University of California for oil shale research. Studies the basic chemistry of retorting to provide data for private industry. Project Leader, Oil Shale Research, P.O. Box 808, Livermore, CA 94550. (415) 422-1100.

League of Women Voters of Colorado - Provides public with factual and unbiased information about issues, such as oil shale, in order to guide citizens to their own conclusions on issues; and promotes more active participation of citizens in government. Director, 1600 Race St., Denver, CO 80206. (303) 320-8493.

National Wildlife Federation - Representing interests in wildlife and natural resource conservation and management, with State and local affiliates. Natural Resource Clinic, Fleming Law Building, Boulder, CO 80309. (303) 492-6552.

Oil Shale Environmental Advisory Panel (OSEAP) - Assists Interior Department in management of the prototype oil shale leases for the protection of the environment. An advisory body that evaluates development plans and makes recommendations to the Secretary of the Interior and to the Bureau of Land Management and Minerals Management Service field official. Panel is composed of Federal, State, local governments and industry members. Chairman, P.O. Box 25007, Denver Federal Center, Denver, CO 80225. (303) 234-3275.

Public Land Institute - A national affiliate of the Natural Resources Defense Council with project offices in Denver. 1720 Race Street, Denver, CO 80206. (303) 379-9740.

Regional Oil Shale Team (ROST) - Comprised of the Bureau of Land Management State Directors of Colorado, Utah, and Wyoming, the governors or their representative from these same States, and is chaired by the Assistant Director for Energy Resources, Bureau of Land Management, Washington D.C. County representatives may participate in an advisory level to their respective State representative. The role of the team is to make recommendations to the Secretary of the Interior concerning the oil shale program, leasing, and leasing related items in particular.

Rocky Mountain Oil and Gas Assn. (RMOGA) - Trade association with an oil shale committee active in environmental, informational and planning efforts. Director, Committee on Oil Shale, 345 Petroleum Bldg., Denver, CO. 80202. (303) 534-8261.

Sandia National Laboratories - Wholly owned subsidiary of Western Electric Corp. with funding from the U.S. Department of Energy for shale research. Works with private industry to research different processing techniques for oil shale extraction. Division Supervisor, In-Situ Processes Div., Division 9747, P.O. Box 5800, Albuquerque, NM 87185. (505) 844-6759.

Utah Mining Assn. - Trade association composed of companies and individuals engaged in various phases of the mineral industry. Executive Vice President, 825 Kearns, Salt Lake City, UT 84101. (801) 364-1874.

Upper Colorado Environmental Plant Center - Established in cooperation with Soil Conservation Service, U.S. Department of Agriculture and two local Colorado soil conservation districts to test seeds and plants for oil shale and other reclamation programs. Center Manager, P.O. Box 448, Meeker, CO 81641. (303) 878-5131.

Western Colorado Congress - An organization of agricultural, consumer, recreation, labor, conservation and community interests concerned about the effects of expanding industrialization of the Western Slope of Colorado. P.O. Box 472, Montrose, CO 81401. (303) 249-1978.

Western Governors Policy Office (WESTPO) - Independent organization of governors of 11 States, designed to meet the challenges posed by expanded State responsibilities in the management and protection of human and natural resources. Provides for attention to matters involving two or more States, particularly those that are better addressed regionally or locally rather than by Federal agencies and national associations. Executive Director, 3333 Quebec, Suite 3000, Denver, CO 80207. (303) 399-9957.

Wyoming Mining Assn. - Trade association of individuals and companies engaged in various phases of the mineral industry. Executive Vice President, Hitching Post Inn, P.O. Box 866, Cheyenne, WY 82001. (307) 635-0331.



# PUBLIC LANDS RESOURCES

## FACT SHEET 6

## OIL SHALE

### CURRENT GENERAL STATUS OF OIL SHALE ACTIVITIES AND SPECIFIC PROJECTS IN COLORADO, UTAH, AND WYOMING

#### General

Oil shale activity in the West has received an increasing amount of attention in the last several years. The Department of the Interior has recognized the need to have a mechanism in place to lease and develop Federal oil shale resources if and when necessary. A systematic process for development of the Federal oil shale resource is more prudent and foresighted than waiting for a deeper energy crisis to force a crash program.

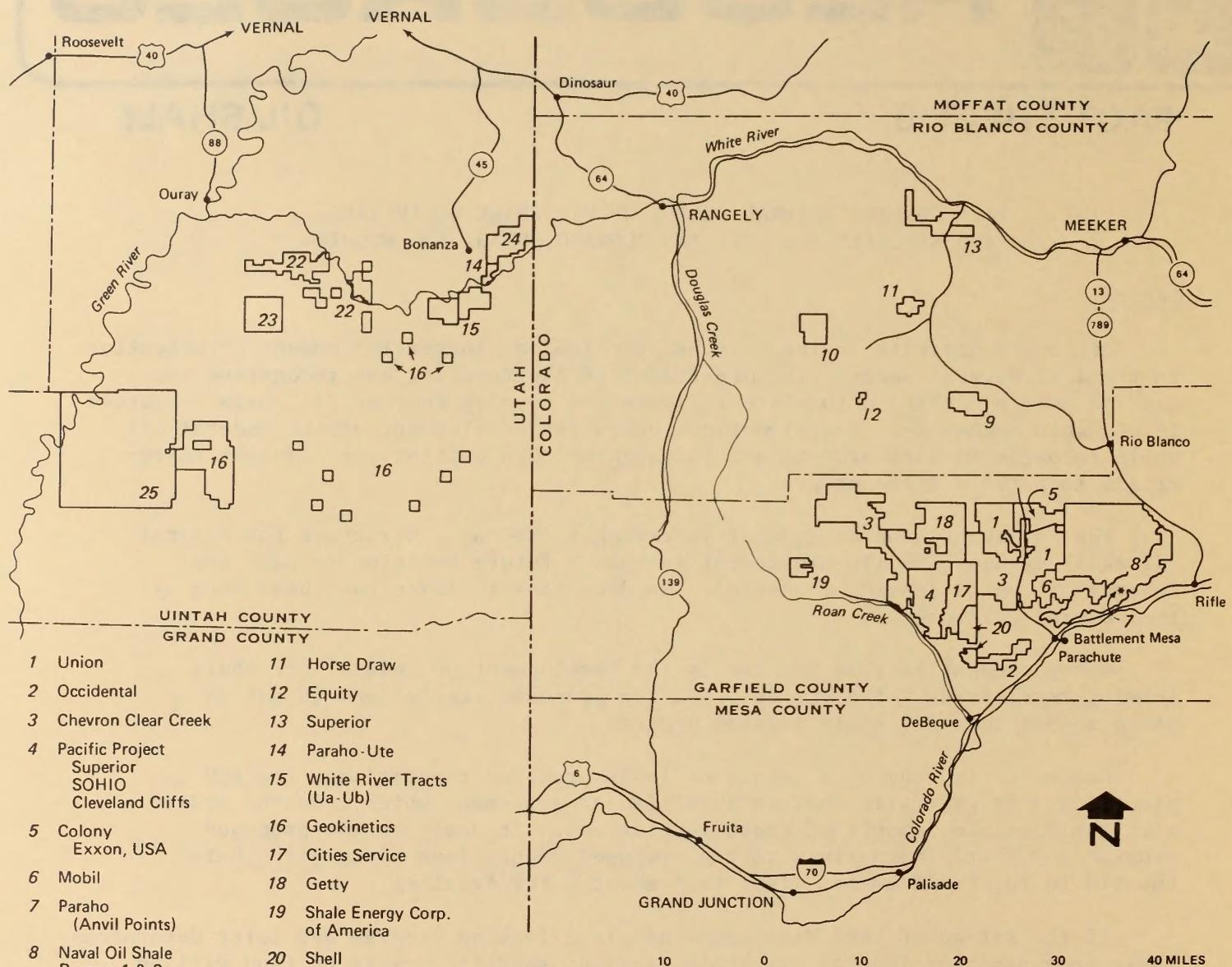
The Bureau of Land Management is trying to set up a structure for Federal oil shale leasing and its management in case a future decision is made that Federal oil shale leasing is needed. No decisions to lease have been made by the Federal government.

A key element in this program is the development of Federal oil shale leasing regulations. The BLM is preparing proposed regulations to put in place a long term oil shale leasing program.

Concurrently, and as a result of these proposed regulations, the BLM is preparing a programmatic environmental impact statement which concerns itself with the possible impacts of those regulations. It analyzes the proposed program and four alternatives to the proposed regulations along with their impacts to the environment. (see fact sheet 8 for details)

If the Bureau of Land Management adopts a leasing program and later determines there is a need for Federal oil shale leasing, specific tracts of land will be identified and analyzed through the Bureau of Land Management's land use planning process (see fact sheet 9 for details).

Effective decisions cannot be made in a vacuum regarding the need for a Federal oil shale leasing program and its possible structure. The oil shale activity occurring on private lands must be considered in the Federal decision-making process.



**STATUS OF OIL SHALE PROJECTS IN COLORADO AND UTAH**  
 (WYOMING HAS NO OIL SHALE PROJECTS AT PRESENT)

(Item 21 intentionally not noted)

- |  |                                     |
|--|-------------------------------------|
| 1 Union  | 11 Horse Draw                       |
| 2 Occidental   | 12 Equity                           |
| 3 Chevron Clear Creek                                      | 13 Superior                         |
| 4 Pacific Project<br>Superior<br>SOHIO<br>Cleveland Cliffs | 14 Paraho-Ute                       |
| 5 Colony<br>Exxon, USA                                     | 15 White River Tracts<br>(Ua-Ub)    |
| 6 Mobil  | 16 Geokinetics                      |
| 7 Paraho<br>(Anvil Points)                                 | 17 Cities Service                   |
| 8 Naval Oil Shale<br>Reserve 1 & 3                         | 18 Getty                            |
| 9 Cathedral Bluffs<br>(tract Cb)<br>Occidental<br>Tenneco  | 19 Shale Energy Corp.<br>of America |
| 10 Rio Blanco<br>(tract Ca)<br>Gulf<br>Standard            | 20 Shell                            |
|  | 22 Tosco Sand Wash                  |
|  | 23 Magic Circle                     |
|  | 24 Syntana-Utah                     |
|  | 25 Naval Oil Shale<br>Reserve 2     |

STATUS OF OIL SHALE PROJECTS

COLORADO

\* C = Construction  
O = Operation

Reference	Project	Technology	Ownership/Right-of-Way (ROW)	Estimated Production (Barrels Per Day)	Direct Employment (1000's)	Status/Remarks
9	Cathedral Bluffs (tract C-b) Occidental Tenneco	F	Multiple level or wide interval underground mining for modified in-situ development. Also planning aboveground retorting	50,000+ by mid-1990s	*C = 3-5 0 = 2-5 for 100,000 barrels per day	Equipping commercial mine shafts and evaluating alternatives
3	Chevron Clear Creek	P	Underground and open pit mining with aboveground retorting	100,000 by mid-1990s	*C = 6-10 0 = 2-3	BLM EIS and permits approval underway. DEIS - 11/1/82 FEIS - 4/1/83 Also participating in CURP.
17	Cities Services	P	Unknown	Unknown	Unknown	Members of consortium (GCC) with Getty and Cities Services for reservoir on Roan Creek
5	Colony Exxon, USA	P	Underground mining with aboveground retorting	47,000	*C = 4-6 0 = 1-2	Completed mine bench, cleared plant site, constructed housing. Project suspended in May 1982
12	Equity	P	In-situ superheated steam	Private land, will require Federal ROW for utilities and pipelines	Unknown	Completed two-year field tests

STATUS OF OIL SHALE PROJECTS  
COLORADO

\* C = Construction  
O = Operation

Reference	Project	Technology	Ownership/Right-of-Way (ROW)		Estimated Production (Barrels Per Day)	Direct Employment (1000's)	Status/Remarks
			Private (P)	State (S)			
18	Getty	P	Unknown		Private land, will require Federal ROW for utilities and pipelines	Unknown	Member of consortium (GCC) with Chevron and Cities Services for reservoir
6	Mobil	P	Underground mining with aboveground retort		Private land, will require Federal ROW for utilities, pipelines, and water reservoir on Elk Creek-North of Newcastle, CO	50-100,000 by late 1990s	Has submitted ROW application for reservoir and access road. BLM to complete combine EIS with Pacific Project by mid-1984
11	Horse Draw	P	Underground mining		Public land, will require Federal ROW for utilities and pipelines	50 by 1988 *C = 1-2 0 = 0.6-1	Has expressed interest in Federal lease. Under a temporary shutdown at present
8	Naval Oil Shale - Reserve #1 & 3	F	Underground mining with aboveground retort		Federal lands, will need Federal ROW for utilities and pipelines	50-200,000 Unknown	DOE prepared EIS - No commercial proposals at present
2	Occidental	P	Modified in-situ		Private, has Federal ROW for roads and facilities	Test Facility *C = 0.3-0.4	Retorts #7 & 8 burned in 1982
7	Paraho (Anvil Points)	F/P	Underground mining with aboveground retort		Federal lands	Test Facility Unknown	Terminated project - moving to State of Kentucky
10	Rio Blanco (Tract C-a) Gulf Standard		Developed modified in-situ, desires to use open pit mine with aboveground retort and pipelines		Federal lands, will need Federal ROW for utilities and pipelines	100-300,000 0 = 2-3 by late 1990s	Awaiting off-site disposal legislation, has applied for suspension of operations

STATUS OF OIL SHALE PROJECTS  
COLORADO

\* C = Construction  
O = Operation

<u>Reference</u>	<u>Project</u>	<u>Technology</u>	<u>Ownership/Right-of-Way (ROW)</u>	<u>Estimated Production (Barrels Per Day)</u>	<u>Direct Employment (1000's)</u>	<u>Status/Remarks</u>
Federal (F) State (S) Private (P)						
19	Shale Energy Corp. of America	P	Underground mining with aboveground retort	5,800 by Unknown late 1980s	.09 -1.3 0 = 0.6 -1.0	Has applied for price support to Synfuels Corp
20	Shell	P	Unknown	Unknown	Unknown	Has county permit for test drilling
13	Superior	P	Underground mining with aboveground retort	12,000 by *C = .09 -1.3 late 1980s 0 = 0.6 -1.0	Has appealed the Federal decision to not allow land exchanges	
4	Pacific Project Superior SOHIO Cleveland Cliffs	P	Underground mining with aboveground retort	50,050 by *C = 2-3 early 1990 with an additional 50,000 by Late 1990	0 = 1.0-1.5	Has completed engineering and started baseline studies. BLM to complete combined EIS with Mobil Project by mid-1984
1	Union	P	Underground mining with aboveground retort	10,000 by *C = 3-5 1984 and 90,000 by 1994	0 = 0.7-1.5	Constructing report and upgrading facilities. Corps of Engineers will write EIS by Nov. 1983

STATUS OF OIL SHALE PROJECTS

\* C = Construction  
O = Operation

Reference		Project	Technology	Ownership/Right-of-Way (ROW)	Estimated Production (Barrels Per Day)	Direct Employment (1000's)	Status/Remarks
Federal (F) State (S) Private (P)	State (S)						
16	Geokinetics	S/P	True in-situ and room and pillar mining	State and private land, will require Federal ROW for utilities, pipeline	73,000 by late 1880s-1990s	*O = 0.2	True in-situ, have tested retorts, securing permits for commercial operations. Room and pillar mining, completing their engineering
14	Paraho-Ute	S/P	Underground mining with aboveground retort	State and private land, will require Federal ROW for utilities, pipeline	42,000 by 1987	*C = 2,075 by 1985 0 = 1,100 (by 1987)	Start construction in 1983. Completing feasibility studies. Applied for loan guarantee with Syngas Corp. Analyzed in Uintah Basin EIS by BLM. EIS completed by Jan. 1983
15	White River Oil Shale Corp. (U-a, U-b)	F	Underground mining with aboveground retort	Federal lands, will require Federal ROW for utilities, pipeline	114,000 by late 1990s	*C = 3-5 0 = 2-3	Detailed development plan approved, commercial design and permits being acquired. Constructing access road and recreational vehicle camp
21	Quintana	-	-	-	-	-	Quintana has merged with Syntanna-Utah (No. 24)

STATUS OF OIL SHALE PROJECTS

UTAH

\* C = Construction  
O = Operation

<u>Reference</u>	<u>Project</u>	<u>Technology</u>	<u>Ownership/Right-of-Way (ROW)</u>	<u>Estimated Production (Barrels Per Day)</u>	<u>Direct Employment (1000's)</u>	<u>Status/Remarks</u>
Federal (F) State (S) Private (P)						
22	Tosco Sand Wash	S	Underground mining with surface retort	Private land, will require Federal ROW for utilities, pipeline	48,000 by 1989	*C = 4.147 (by 1986) 0 = 2.330 (by 1990)
23	Magic Circle	S	Underground mining with surface retort	Private land, will require Federal ROW for utilities, pipeline	31,500 by 1988	*C = .820 (by 1987) 0 = 1.890 (by 1988)
24	Syntana-Utah	S	Underground mining with surface retort	Private land, will require Federal ROW for utilities, pipeline	50,000 1989	*C = 1.525 (by 1985) 0 = 2.1 (by 1995)
25	Naval Oil Shale Reserve #2 (NOSR)	F	None	Federal Lands	Unknown	No commercial plans

OWNERSHIP OF SHALE RESOURCE

Area of Commercial Potential (acres)	Federally Administered (%)	Known Deposits gallons per ton	Reserves in Place (billions of barrels)	
Piceance Creek Basin, Colorado	1,800,000	79	25-65	450-500
		10-25	800	Recovered resource largely within Parachute Creek Member of Green River Formation averaging 500 feet thick at basin margins to 2000 feet thick at depositional center.
		5-10	200	Richest shales are contained in Mahogany Zone which averages 100 feet to 200 feet in thickness from basin margins inward. Combined Mahogany Zone and Lower Zone shales averaging greater than 25 gallons per ton contain 2.3 million barrels per acre.
	Total		<u>1,500</u>	
Uinta Basin, Utah	4,900,000	77	25-65	90
		10-25		Recovered resource largely within 100 feet thick Mahogany Zone within 750 feet thick Parachute Creek Member of Green River Formation
		5-10		Mahogany Zone shales averaging greater than 25 gallons per ton are approximately 90 feet thick and yield 162,000 barrels per acre.
	Total		<u>1,820</u>	
Wyoming basins, principally the Green River Basin	4,300,000	62	25-65	30
		10-25		Recovered resource largely within Tipton, Wilkins Peak, and Laney Member Shales of Green River Formation averaging 150 feet to 500 feet thick. Where present, Tipton shales greater than 15 gallons per ton contain 35,000 barrels per acre; Wilkins Peak shales greater than 15 gallons per ton contain 45,000 barrels per acre and Laney Shales greater than 20 gallons per ton contain 130,000 barrels per acre.
		5-10	300	
	Total			<u>730*</u>

\*Department of Energy reports total resource in Green River Basin of 244 billion barrels.



# PUBLIC LANDS RESOURCES

## FACT SHEET 7

## OIL SHALE

### PROTOTYPE ENVIRONMENTAL IMPACT STATEMENT (COLORADO)

The prototype oil shale leasing program was initiated for the primary purpose of assisting development of oil shale technology on a commercial scale. An integral part of this development is the opportunity to evaluate technologies on a scale approaching commercial size operation.

The BLM was directed on November 16, 1981, by the Secretary of the Interior, to consider offering additional tracts for leasing under the prototype program which in turn required the preparation of an environmental impact statement (EIS). This document will supplement the EIS for prototype leasing published in 1973.

New issues addressed in the supplemental EIS are primarily: 1) development of sodium (saline) minerals associated with oil shale within the area of the tracts to be offered, as well as the development of oil shale; and 2) to incorporate legislative changes since 1973 into the prototype leasing program. The supplemental EIS addresses two tracts (C-11 and C-18, see map).

Response to a formal call for expression of interest helped determine the scope of the EIS. Close cooperation of State and local governments also helped define the issues to be considered. The cooperation of the Oil Shale Office of the Minerals Management Service was an integral part of the EIS process.

It is anticipated that up to two tracts could be offered for lease sale in March of 1983.

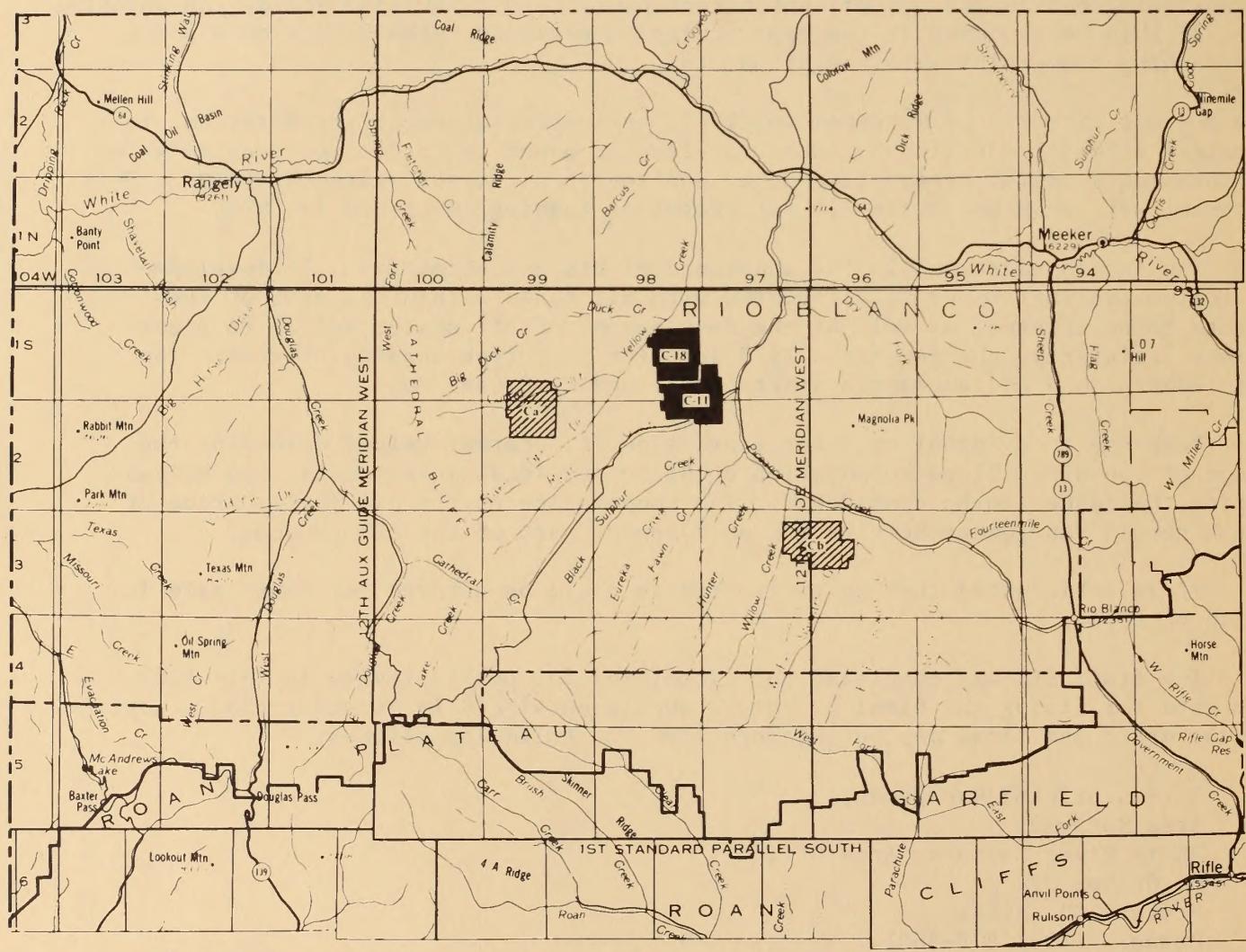
The draft EIS was completed and circulated for public review in July 1982. The date for filing the final prototype supplemental EIS is December 1982. Copies of the draft and final may be obtained from the following offices:

Bureau of Land Management  
Area Manager  
White River Resource Area Office  
P. O. Box 928  
Meeker, CO 81641  
Phone: (303) 878-3601  
FTS: access code 303-878-3601

(see reverse side for map)

Bureau of Land Management  
 District Manager  
 Craig District Office  
 P. O. Box 248  
 Craig, CO 81626  
 Phone: (303) 824-8261  
 FTS: access code 303-824-8261

Bureau of Land Management  
 Branch of Energy and Minerals  
 Colorado State Office  
 1037 20th Street  
 Denver, CO 80202  
 Phone: (303) 837-3008  
 FTS: access code 327-4325





# PUBLIC LANDS RESOURCES

## FACT SHEET 8

## OIL SHALE

### PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

A programmatic environmental impact statement (EIS) is being prepared to provide information for the Secretary of the Interior and for the public concerning potential impacts to the environment which may be caused by a proposed program for leasing Federal oil shale reserves.

Federal leasing for oil shale development was prepared and analyzed in this document. In addition, alternatives to this program were formulated from public and governmental input and were also analyzed. Consequently, the following situations are addressed in this EIS.

The EIS assesses the cumulative impacts which could result if permanent oil shale regulations are adopted. The analysis focuses on private and Federal oil shale development (both low and high production levels), and impacts from production of the Federal oil shale resource (low and high production levels) in the oil shale region of Colorado, Utah, and Wyoming for the years 1990-2000. Three major types of alternatives will be evaluated: 1) no action (no permanent Federal leasing); 2) program alternatives (oil shale activity planning, concessionary leasing, direct leasing, prototype leasing only); 3) conservation and alternative energy sources.

The major environmental issues addressed are those which were identified in the scoping process: air quality, socioeconomics, water resources, and wildlife.

Draft regulations for implementing the proposed program are being published at about the same time as the draft EIS (see following schedule).

In summary, the proposed action involves an oil shale management program which adopts certain regulations for a permanent oil shale program. The following steps would be involved:

- 1) Preparation or use of BLM land use plans to identify oil shale lease tracts within areas acceptable for oil shale development.
- 2) Public/State consultation concerning oil shale development through the Regional Oil Shale Team.
- 3) Initiation of a competitive leasing system which encourages a fair economic return for oil shale leases.

4) Regulations and leases which will make provisions for diligence on the part of the lessee, royalty rates, rentals, lease terms, lease modifications, lease transfers, and lease cancellations.

The actual procedures for this program are explained in proposed regulations and incorporated, by reference, into this EIS. The other alternatives and their descriptions are addressed in the programmatic EIS.

The present schedule and key decision point(s) for the EIS are:

- |                                 |                  |
|---------------------------------|------------------|
| 1) Draft Programmatic EIS       | **               |
| 2) Comments must be received by | **               |
| 3) Final EIS                    | -April 30, 1983* |
| 4) Decision document            | -May 31, 1983    |

The present schedule for the oil shale regulations are:

- |                                  |                |
|----------------------------------|----------------|
| 1) Draft regulations             | **             |
| 2) Comments must be received by  | **             |
| 3) Final regulations             | -May 31, 1983* |
| 4) Effective date of regulations | -June 30, 1983 |

\*This date is approximately four months later than originally scheduled. These dates will allow for a more comprehensive document and better participation by the public.

\*\*Final dates, time, and location(s) will be announced in local newspapers and the Federal Register.

#### EIS CONTACT:

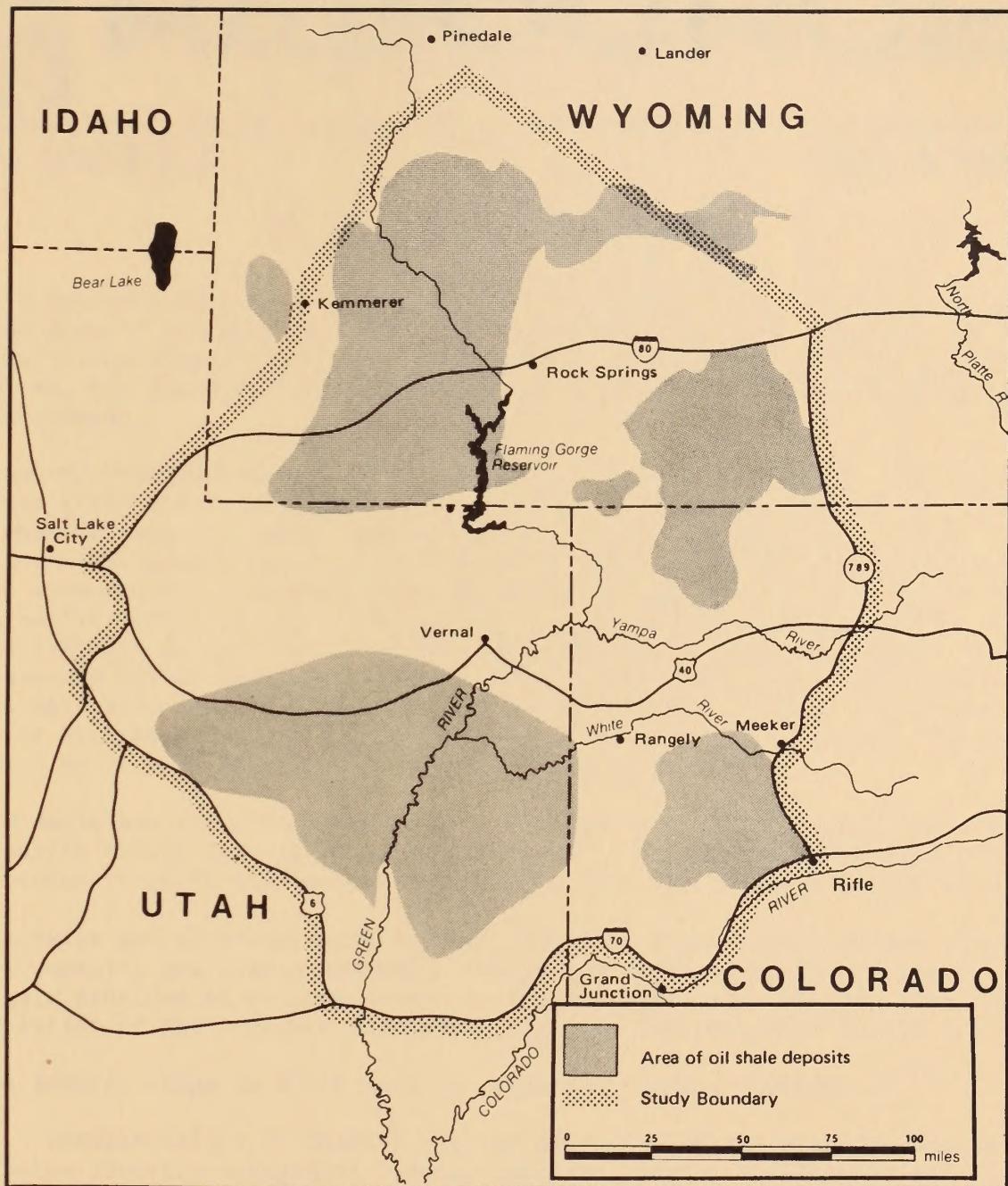
Questions and comments on the programmatic EIS should be directed to:

Jack Edwards, Team Leader  
Bureau of Land Management  
EIS Services  
555 Zang Street, Third Floor East  
Denver, CO 80228  
Phone: (303) 234-6737  
FTS: access code 234-6737

#### REGULATIONS CONTACT:

Questions and comments on the programmatic regulations should be directed to:

Donald Brabson  
Bureau of Land Management (540)  
Branch of Tar Sand and Oil Shale  
18th and C Streets, N.W.  
Washington D.C. 20240  
Phone: (202) 343-3258  
FTS: access code 343-3258



PROGRAMMATIC OIL SHALE REGION





# PUBLIC LANDS RESOURCES

## FACT SHEET 9

## OIL SHALE

### LAND USE PLANNING AND OIL SHALE GENERAL BACKGROUND AND PROCESS

If a decision is made by the Secretary of the Interior to implement a permanent Federal oil shale leasing program following the completion of the programmatic environmental impact statement and the development of program regulations, the decision will be implemented through the Bureau's land use planning process.

Resource Management Plans (RMP) and their associated environmental impact statements (EIS) would be prepared for any areas within the tri-state oil shale region where a need for additional Federal oil shale leasing has been identified. The Resource Management Plan and environmental impact statements will analyze both the site-specific and cumulative environmental and socio-economic impacts of alternative levels of oil shale leasing and of different combinations of specific tracts. It will be a multiple use planning document which will consider other resource values including wildlife, recreation, range, etc. The cumulative analysis will also consider the probable levels of other ongoing or proposed developments (for example: oil and gas, coal, power plants, water projects) that will occur with or without additional Federal oil shale leasing.

The decisions resulting from these plans and environmental impact statements will identify tracts for oil shale leasing along with other program decisions that may be needed to guide the comprehensive multiple-use management of the area.

Extensive public involvement is built into the resource management planning and environmental analysis processes. Public meetings and opportunities to comment are provided at various stages in the approximately two-year time frame for completion of the resource management plan and environmental impact statement.

The general steps in BLM's land use planning process include:

1. IDENTIFICATION OF ISSUES: At the beginning of the planning process the public helps identify management issues, concerns, needs, development and protection opportunities to be considered in the Resource Management Plan.

2. DEVELOPMENT OF PLANNING CRITERIA: Planning criteria are developed to guide the preparation of the Resource Management Plan to make sure it focuses on the issues identified previously. One important function of planning criteria is

to zero in on the important data that needs to be collected and analyzed in the land use plan. Planning criteria serve as guidelines throughout the planning process. They are published in order to give the public an opportunity to comment on their validity.

3. INVENTORY: Needed data and information are collected or assembled if already available.

4. MANAGEMENT SITUATION ANALYSIS: The capability of the public land resources to respond to the needs, concerns, and opportunities identified through public input is analyzed and documented.

5. FORMULATION OF ALTERNATIVES: Several complete, reasonable resource management alternatives are prepared. These alternatives include the continuation of the existing management practices (no action) as well as alternatives covering a range of choices regarding resource management practices in the area.

6. ESTIMATION OF THE EFFECTS OF THE ALTERNATIVES: Each alternative is analyzed and the physical, biological, economic, and social effects of implementing it documented.

7. SELECTION OF PREFERRED ALTERNATIVE: After evaluating the effects of each alternative, a preferred alternative is developed. The preferred alternative is that management of the resources in the area that appears to best address the needs and issues identified earlier in the process. The preferred alternative is identified in the draft environmental impact statement analyzing the alternative Resource Management Plans for the area. The public is given an opportunity to comment on the alternatives considered and analyses presented in the draft environmental impact statement.

8. SELECTION OF THE RESOURCE MANAGEMENT PLAN: After publication of the draft environmental impact statement, all the comments received are evaluated. A proposed Resource Management Plan and final environmental impact statement are developed. The public is given an opportunity to review the final Resource Management Plan and environmental impact statement before it is implemented.

9. MONITORING AND EVALUATION: The Resource Management Plan is evaluated periodically to make sure it is still valid and applicable to the current situation. If circumstances are sufficiently changed or a great deal of new information is now available, the plan may be amended or revised. Opportunities for public participation are provided throughout the amendment or revision process.



# PUBLIC LANDS RESOURCES

## FACT SHEET 10

## OIL SHALE

### LAND USE PLANS IN COLORADO

On August 24, 1982, the Bureau of Land Management began preparation of a resource management plan (RMP) for the 589,000 acres of public land in the Piceance Basin planning unit. The RMP will decide the appropriate multiple-use management direction for the area as well as deciding specific tracts for oil shale leasing and development. The draft RMP and environmental impact statement will be available for public review and comment on April 30, 1984. The final RMP will be completed on August 15, 1984.

In addition to other public involvement mandated to occur during the preparation of an RMP, the BLM will submit a call to the public early in the planning process for expressions of interest concerning the delineation of potential areas that are appropriate for oil shale leasing and areas that are inappropriate for leasing.

For further information regarding this resource management plan contact:

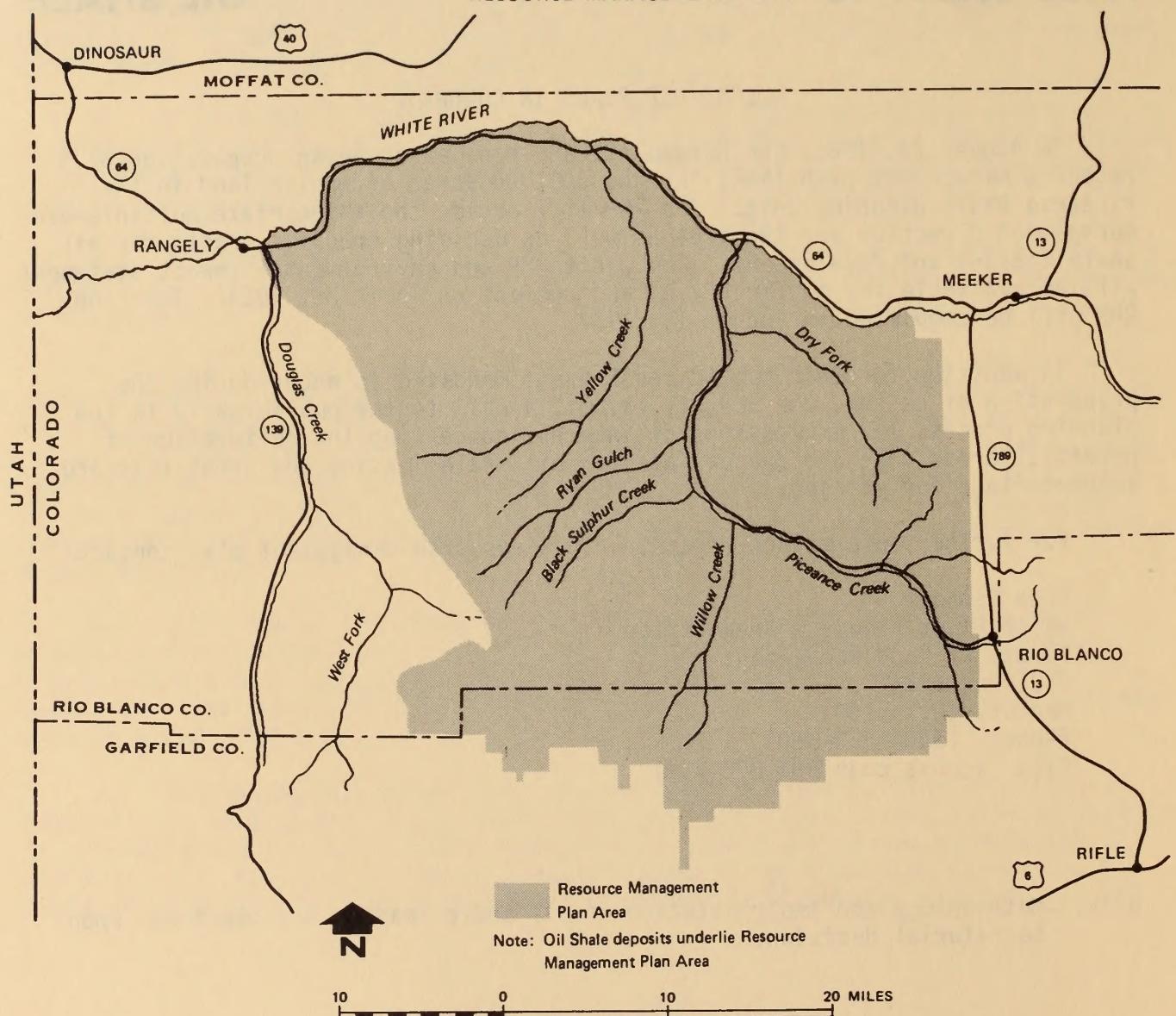
Area Manager  
White River Resource Area Office  
Bureau of Land Management  
P.O. Box 928  
Meeker, CO. 81641  
Phone: (303) 878-3601  
FTS: access code 303-878-3601

NOTE: Methodology and implementation of oil shale leasing are dependent upon Secretarial decision.

(see reverse side for map)

8-82  
(Revised 9-82)

PICEANCE BASIN  
RESOURCE MANAGEMENT PLAN





# PUBLIC LANDS RESOURCES

## FACT SHEET 11

## OIL SHALE

### LAND USE PLANS IN UTAH

The vast majority of the oil shale deposits in Utah are located in the Vernal District's Bookcliffs Resource Area. Work is progressing on a Resource Management Plan (RMP) for the area in which possible development of the oil shale resource will be analyzed. The RMP and resulting environmental impact statement is scheduled for completion by September 1, 1984, with an initial lease sale in December 1984 if approved by the Department of the Interior in consultation with the State of Utah. A call for expressions of interest to identify potential leasing and non-leasing of oil shale areas has been issued for public comment as of September 1982 regarding the Bookcliffs RMP. A call for expressions of interest to identify specific tracts for possible leasing or non-leasing will be issued in the spring of 1983.

For further information on land use plans in Utah contact:

Area Manager  
Bookcliffs Resource Area Office  
Bureau of Land Management  
170 S. 500 East  
Vernal, UT 84078  
Phone: (801) 789-1362  
FTS: access code 801-789-1362

NOTE: Methodology and implementation for oil shale leasing are dependent upon Secretarial decision.

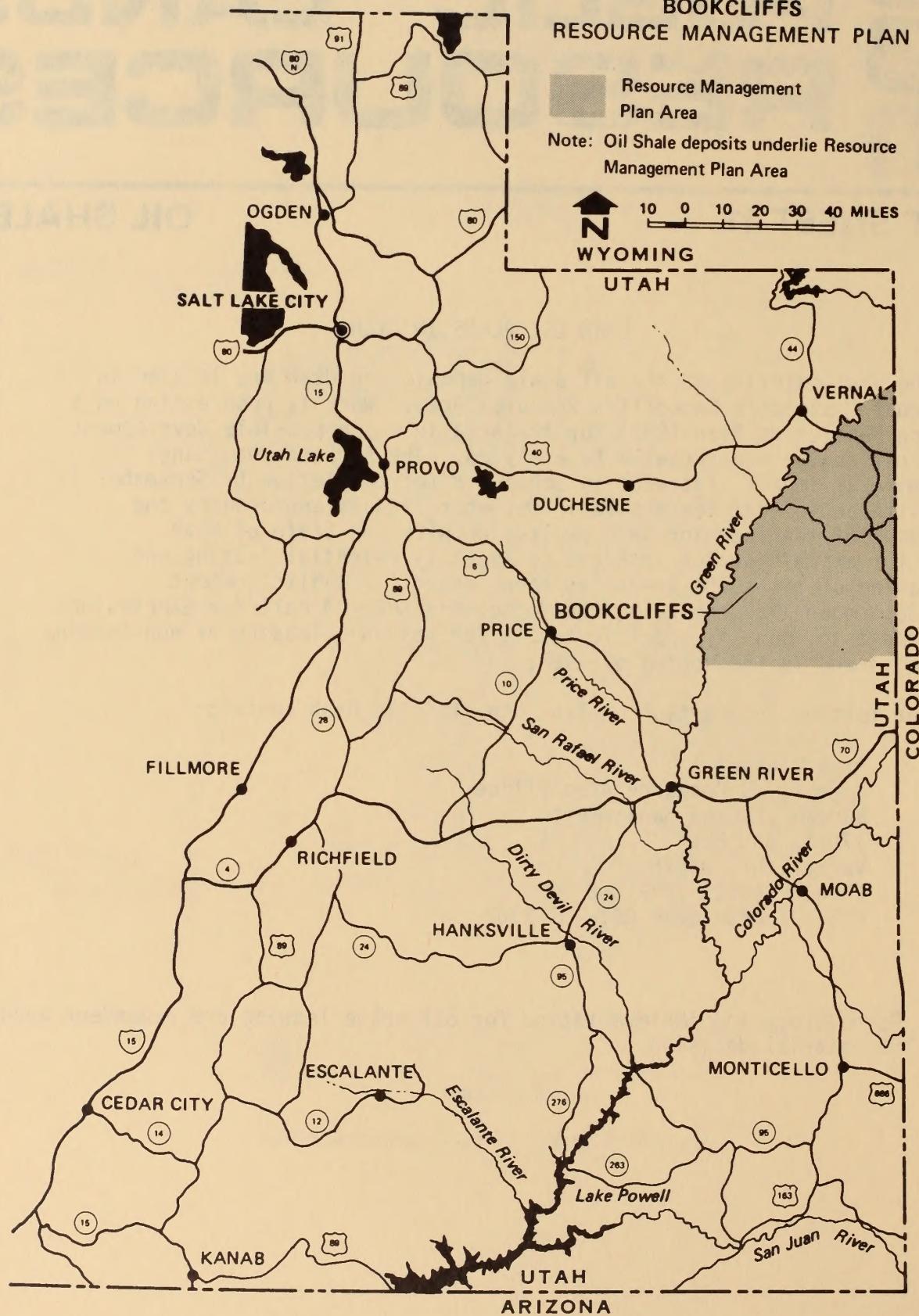
(see reverse side for map)

8-82  
(Revised 9-82)

## BOOKCLIFFS RESOURCE MANAGEMENT PLAN

Resource Management  
Plan Area

Note: Oil Shale deposits underlie Resource  
Management Plan Area





# PUBLIC LANDS RESOURCES

## FACT SHEET 12

## OIL SHALE

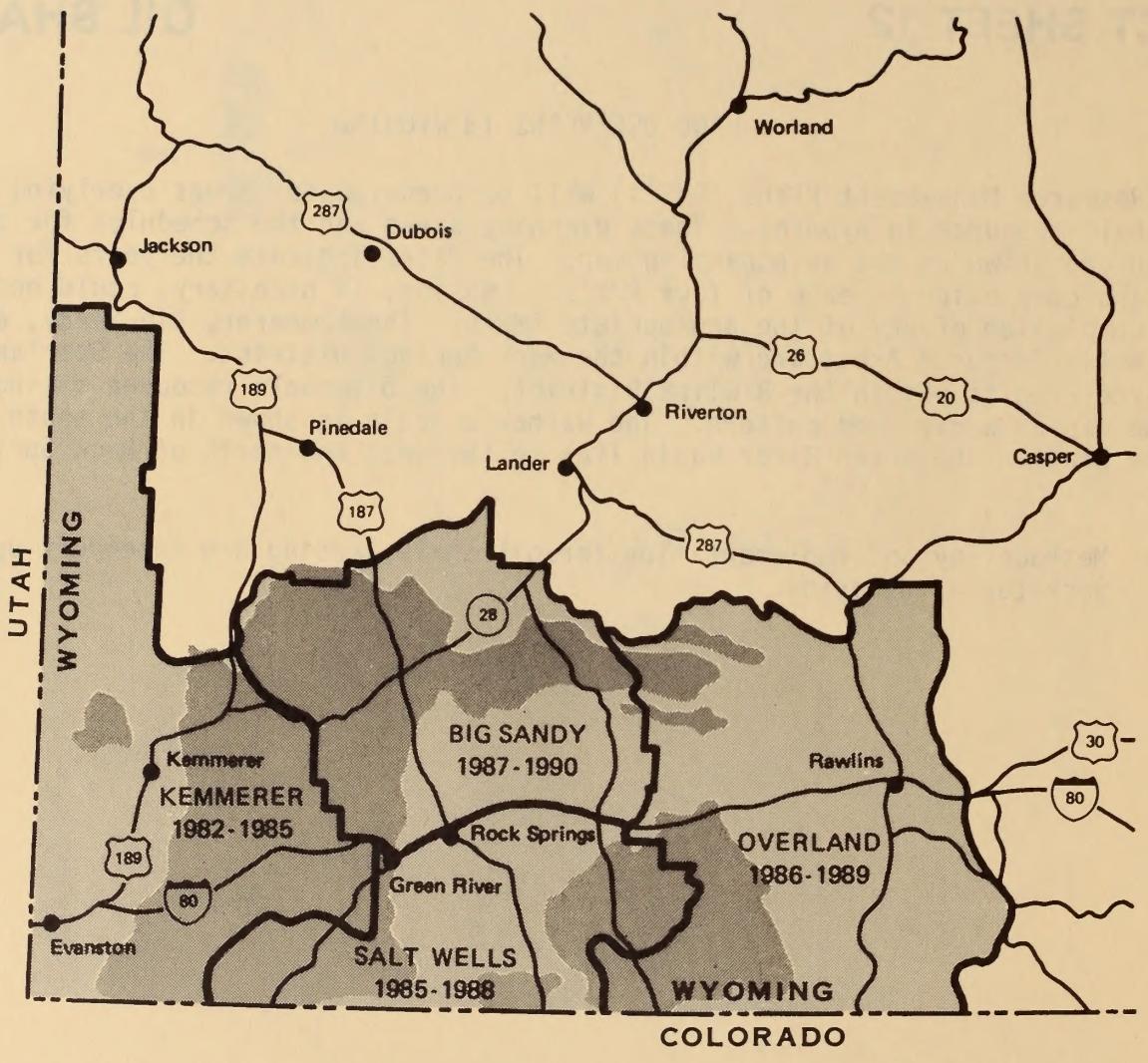
### LAND USE PLANS IN WYOMING

Resource Management Plans (RMP's) will be prepared for areas overlying the oil shale resource in Wyoming. These planning areas and the schedules for preparation are shown on the accompanying map. The dates indicate the years for initiation and completion of each of four RMP's. Leasing, if necessary, could occur upon completion of any of the appropriate RMP's. The Kemmerer, Big Sandy, and Salt Wells Resource Areas are within the Rock Springs District. The Overland Resource Area is within the Rawlins District. The oil shale resource is indicated on the map by a darkened pattern. The Washakie Basin is shown in the south center of the State. The Green River Basin lies to the west and north of Rock Springs.

NOTE: Methodology and implementation for oil shale leasing are dependent upon Secretarial decision.

(see reverse side for map)

8-82  
(Revised 9-82)



#### RESOURCE MANAGEMENT PLANS - WYOMING

0 10 20 30 40 50 Miles



Oil Shale Resources  
 Resource Management Plan Area



# PUBLIC LANDS RESOURCES

## FACT SHEET 13

## OIL SHALE

### CHEVRON EIS - PRIVATE OIL SHALE (COLORADO)

In early 1981, Chevron Shale Oil Company (Chevron) announced plans to proceed with the development of a 100,000-barrel-per-day oil project located about 25 miles north of Debeque in Garfield County, Colorado. The project as proposed by Chevron included both surface and underground mining of shale, retorting, and upgrading of shale oil on Clear Creek Mesa, shipment of upgraded product by pipeline, and withdrawal and storage of water from the Colorado River for processing oil shale and disposing spent shale. The major alternatives call for various project elements, in particular upgrading, to take place on a site in Mesa County, north of Fruita.

Since the proposed project involves public land for road corridors, a BLM right-of-way (ROW) approval is required. Chevron's ROW application triggered the EIS on the Clear Creek Project. As the lead Federal agency, the BLM has designated the Grand Junction District Office to prepare the EIS and coordinate communication with Federal, State, and local agencies.

For further information regarding this project contact:

District Manager

Grand Junction District Office

Bureau of Land Management

764 Horizon Drive

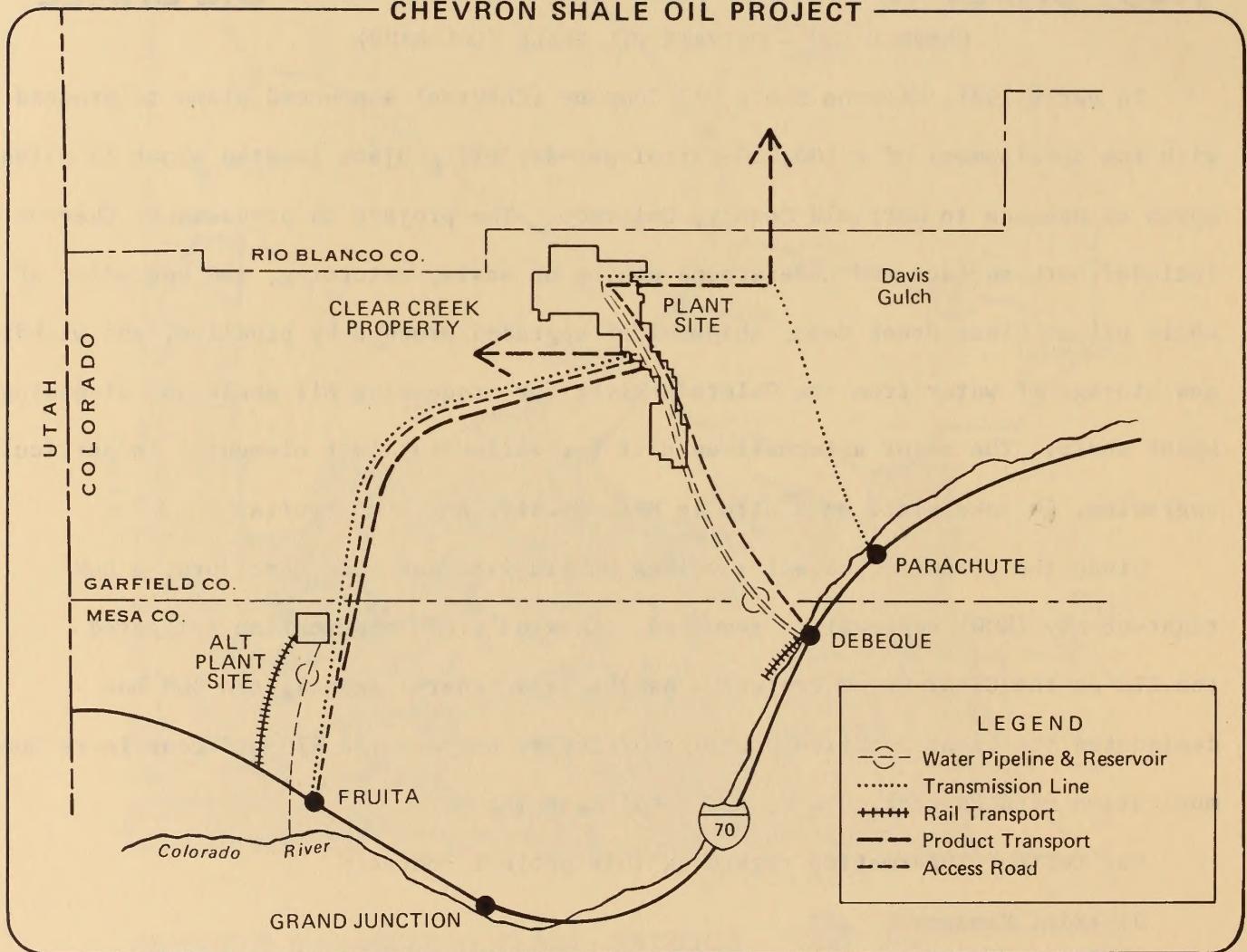
Grand Junction, Colorado 81501

Phone: (303) 243-6552

FTS: access code 323-0011

(see reverse side for map)

**CHEVRON SHALE OIL PROJECT**



LOCATION OF CLEAR CREEK PROJECT ALTERNATIVES



# PUBLIC LANDS RESOURCES

## FACT SHEET 14

## OIL SHALE

### UINTAH BASIN SYNFUELS DEVELOPMENT ENVIRONMENTAL IMPACT STATEMENT PRIVATE OIL SHALE (UTAH)

The Uintah Basin Synfuels Development Environmental Impact Statement assesses the environmental impacts of synfuel projects proposed for the Uintah Basin of northeastern Utah. Site-specific impact analyses are presented for five projects, including their alternatives, proposed to begin construction within the next two years. These projects are the Enercor Rainbow Project, Magic Circle Cottonwood Wash Project, Paraho-Ute Project, Syntana-Utah Project, and Tosco Sand Wash Project.

A regional cumulative environmental analysis is also included in this EIS. It considers the cumulative impacts of the five site-specific projects, four more conceptual projects (Enercor-Mono Power P.R Springs Project, Geokinetics Lofreco and Agency Draw Projects, and Sohio Asphalt Ridge Tar Sand Project), plus other interrelated projects planned for development in the Uintah Basin during the analysis period.

Based on the issues and concerns identified during the scoping process, the EIS focuses on the impacts to socioeconomic, water resources, air quality, and wildlife.

#### EIS Contact

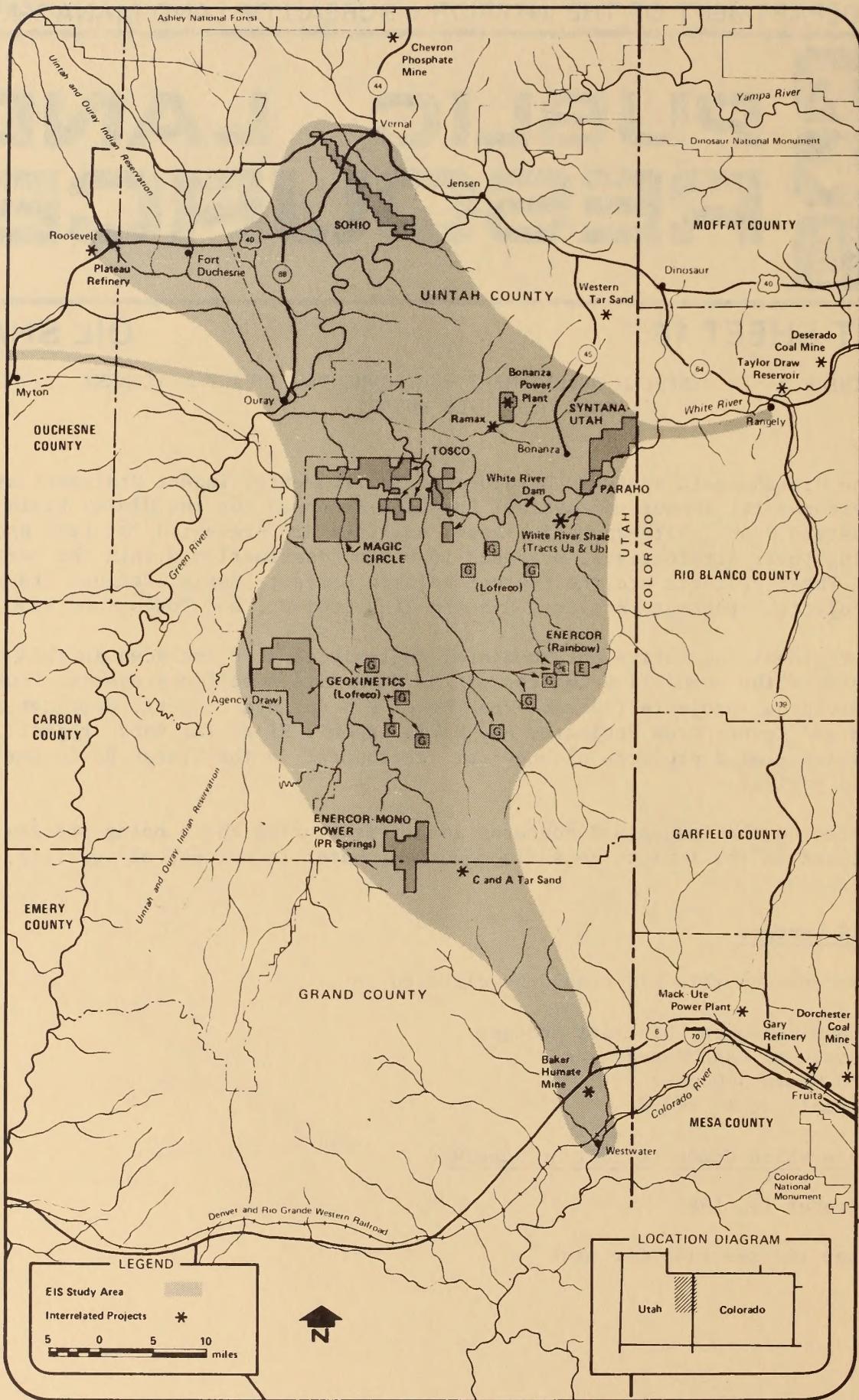
Comments on this EIS should be directed to:

Lloyd Ferguson, District Manager  
Bureau of Land Management  
170 South 500 East  
Vernal, Utah 84078

#### Date Which Comments Must Be Received

October 19, 1982

(see reverse side for map)



UINTAH BASIN  
SYNFUELS DEVELOPMENT

UINTAH BASIN SYNFUELS DEVELOPMENT, UTAH  
SUMMARY OF APPLICANTS' PROPOSED PROJECTS

Project Name	Project Type	Mine Type	Water Source	Power Source	Process Type	Upgrading	Product Transportation	Anticipated Full Production Date/Project Life <sup>c</sup>
Enercor (Rainbow) <sup>a</sup>	Tar Sand	Open Pit	White River	Bonanza Power Plant	Hot Water	Delayed Coking	Truck	1985/20 years
Enercor-Mono Power (P.R. Springs) <sup>b</sup>	Tar Sand	Open Pit	White River	Bonanza Power Plant	Hot Water	Delayed Coking	Pipeline to Railhead near Westwater, UT	1990/20 years
Magic Circle (Cottonwood Wash) <sup>a</sup>	Oil Shale	Underground Room & Pillar	Green River	On-Site	Improved NTU/T3	Water Removal Only	Pipelines to Roosevelt, Chevron Pipeline, and Gary Refinery Pipeline (at Bonanza)	1988/30 years
Paraho (Paraho-Ute) <sup>a</sup>	Oil Shale	Underground Room & Pillar	White River	On-Site (at full production)	Paraho Direct Heat	Natural Gas Hydrotreating	Pipeline to Chevron Pipeline	1987/10 years
Syntana-Utah <sup>a</sup>	Oil Shale	Underground Room & Pillar	White River	Bonanza Power Plant	Superior and TOSCO	Natural Gas Hydrotreating	Pipeline to Rangely	1994/30 years
Tosco (Sand Wash) <sup>a</sup>	Oil Shale	Underground Room & Pillar	White River	Bonanza Power Plant	TOSCO	Fractionation Hydrotreating	Pipeline to Rangely	1989/35 years
Geokinetics (Agency Draw) <sup>b</sup>	Oil Shale	Underground Room & Pillar	Green River	On-Site	TOSCO	Unknown	Pipeline to Roosevelt	1987/30 years
(Lofreco) <sup>b</sup>	Oil Shale	In-situ	None	Bonanza Power Plant	In-situ	Unknown	Truck to Agency Draw	1994/20 years
Sohio Shale Oil (Asphalt Ridge) <sup>b</sup>	Tar Sand	Open Pit	Green River	Utah Power and Light	Counter-current Solvent Extraction	Delayed Coking and Hydro-treating	Pipeline to Salt Lake City or Midwest U.S.	1989/20 years

<sup>a</sup>Site-specific projects analyzed in detail in the second part of this EIS.

<sup>b</sup>Projects proposed for later development which are analyzed conceptually in this EIS; see Appendices R-B, R-C, and R-D for a brief description of each.

<sup>c</sup>Project life based on current reserves under lease. Life of some projects may be extended with future acquisition of additional reserves.





# PUBLIC LANDS RESOURCES

## FACT SHEET 16

## OIL SHALE

### TAR SAND (UTAH)

#### Background

Tar sand is a bituminous (oil-impregnated) sand constituting the largest known, nonfluid petroleum resource in the United States (coal and oil shale are not considered a petroleum resource). With current technology, about 2 billion barrels of oil can be recovered.

America's tar sand is estimated to contain 30 billion barrels of oil. About 75 percent of our tar sand is located on Federal lands. And approximately 90 percent of it is found in Utah. Utah's tar sand is concentrated in the counties of Uintah, Carbon, Wayne, Garfield, and Grand. Smaller amounts are found in Duchesne, Emery, and San Juan.

Oil can be extracted from tar sand either by surface mining followed by processing using heat, hot water, and/or solvents or by in-situ methods by injecting steam, solvent, and/or heat. Only about 10-15 percent of Utah's tar sand is amenable to surface mining due to the depth of the resource.

Although the Bureau of Land Management had authority to lease tar sand since 1960, due to the difficulty in distinguishing between oil and tar sand before drilling no tar sand has been leased since 1965.

#### Present Status

The Combined Hydrocarbon Leasing Act of 1981 (Public Law 97-78) became law on November 16, 1981. The main features of the law include: a) redefining oil to include tar sand, b) establishing eleven Special Tar Sand Areas (STSAs) in Utah, c) providing for development of oil and tar sand in STSAs under a single new type of lease - combined hydrocarbon lease.

Several mandates to the Bureau of Land Management were: a) developing regulations for the conversion of existing oil and gas leases and valid mining

claims to combined hydrocarbon leases within 6 months, b) issuing regulations implementing a competitive leasing program in special tar sand areas, and c) making changes to future oil and gas leases to include tar sand.

The Bureau has initiated development of a competitive tar sand leasing program which has undergone public review. The comment period closed August 13, 1982. The Bureau is presently preparing the final regulations.

Additionally, the Bureau is preparing a regional environmental impact statement for eastern Utah. Scoping sessions will be held in Utah in November 1982. Specific times and places have not been set. Other key dates are: draft environmental impact statement, completed August 1983; and the final EIS, February 1984.

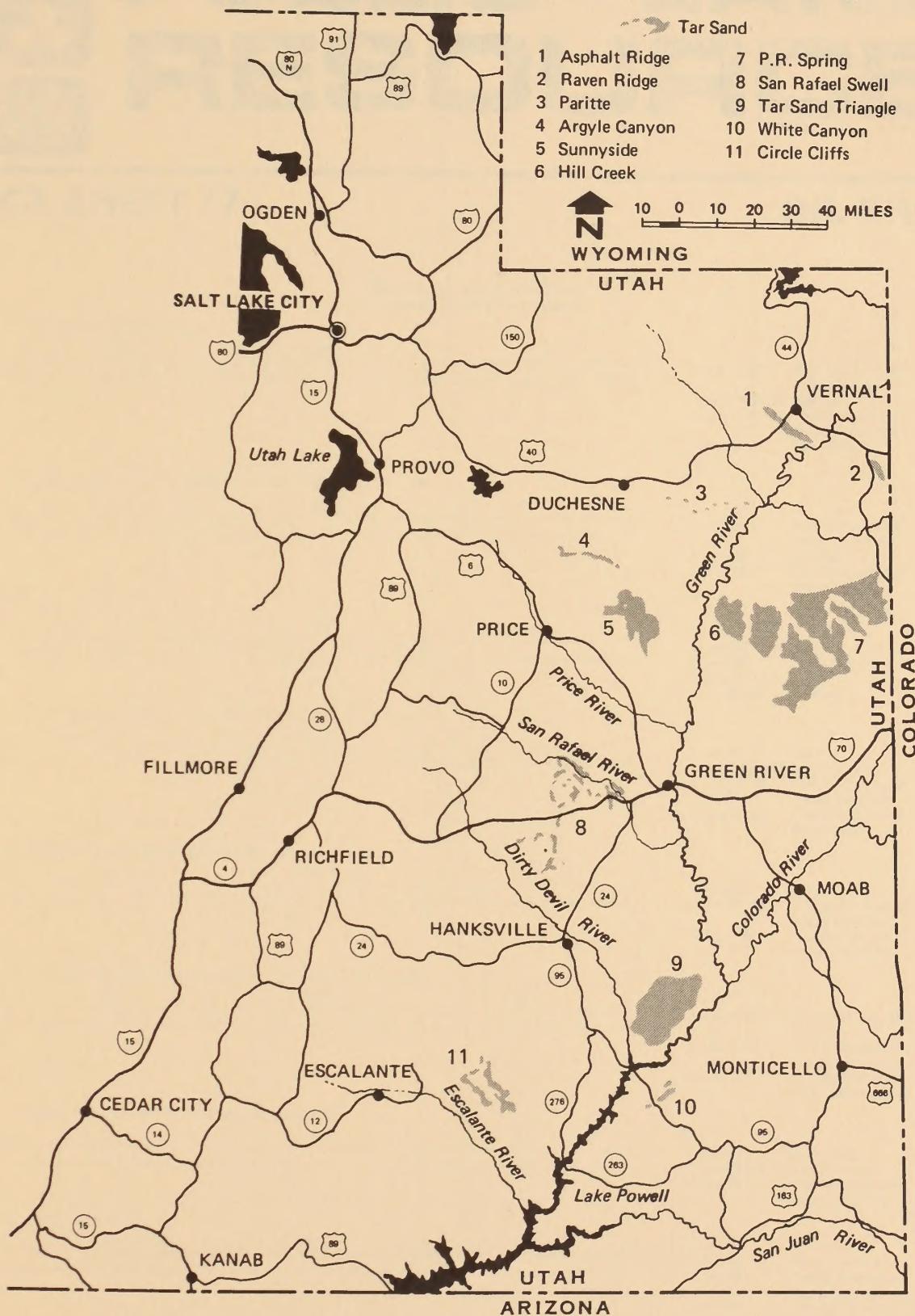
For further information contact:

Coordinator  
Utah State Office  
Bureau of Land Management  
Division of Resources  
University Club Bldg.  
136 East South Temple  
Salt Lake City, Utah 84111  
Phone: (801) 524-4257  
FTS: access code 588-4257

Team Leader  
Tar Sand EIS  
Environmental Project Staff  
Bureau of Land Management  
150 E. 900 North  
P.O. Box 767  
Richfield, Utah  
Phone: (801) 896-8221  
FTS: access code 584-8011

(see next page for map)

### TAR SAND DEPOSITS - UTAH







# PUBLIC LANDS RESOURCES

## FACT SHEET 17

## OIL SHALE

### FEDERAL OIL SHALE SCHEDULE COLORADO, UTAH AND WYOMING

#### 1. PROTOTYPE (COLORADO)

82	83	84	
a	b	c	d

- a. Jul 20, 82 Draft Environmental Impact Statement
- b. Aug 24-26, 82 Hearings
- c. Dec 3, 82 Final Environmental Impact Statement
- d. Mar 83 Lease Bidding

#### 2. PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

82	83	84
ab	c	

- a. Late 82 Draft Environmental Impact Statement
- b. Late 82 Hearings
- c. Apr 10, 83 Final Environmental Impact Statement

#### 3. REGULATIONS

82	83	84
ab	c d	

- a. Late 82 Draft Public Comments
- b. Late 82 Final
- c. May 31, 83 Effective
- d. Jun 30, 83

#### 4. PICEANCE BASIN RESOURCE MANAGEMENT PLAN - COLORADO

82	83	84
ab		c d

- a. Aug 82 Start
- b. Aug 24-26, 82 Public Scoping
- c. Apr 30, 84 Draft Environmental Impact Statement
- d. Aug 15, 84 Final Environmental Impact Statement

#### 5. BOOKCLIFFS RESOURCE MANAGEMENT PLAN - UTAH

82	83	84
a		b c

- a. Aug 82 Start
- b. Apr 27, 84 Draft Environmental Impact Statement
- c. Sep 1, 84 Final Environmental Impact Statement

#### 6. CHEVRON ENVIRONMENTAL IMPACT STATEMENT - COLORADO

82	83	84
a b	c	

- a. Jul 26, 82 Scoping for upgrading facility
- b. Dec 1, 82 Draft Environmental Impact Statement
- c. Apr 1, 83 Final Environmental Impact Statement

#### 7. MOBIL/PACIFIC - PRIVATE OIL SHALE - COLORADO

82	83	84
a b		c

- a. Jul 26, 82 General Call
- b. Aug 26, 82 Specific Requests
- c. Mid 84 Final Environmental Impact Statement

#### 8. TAR SANDS - UTAH

82	83	84
a	b	c

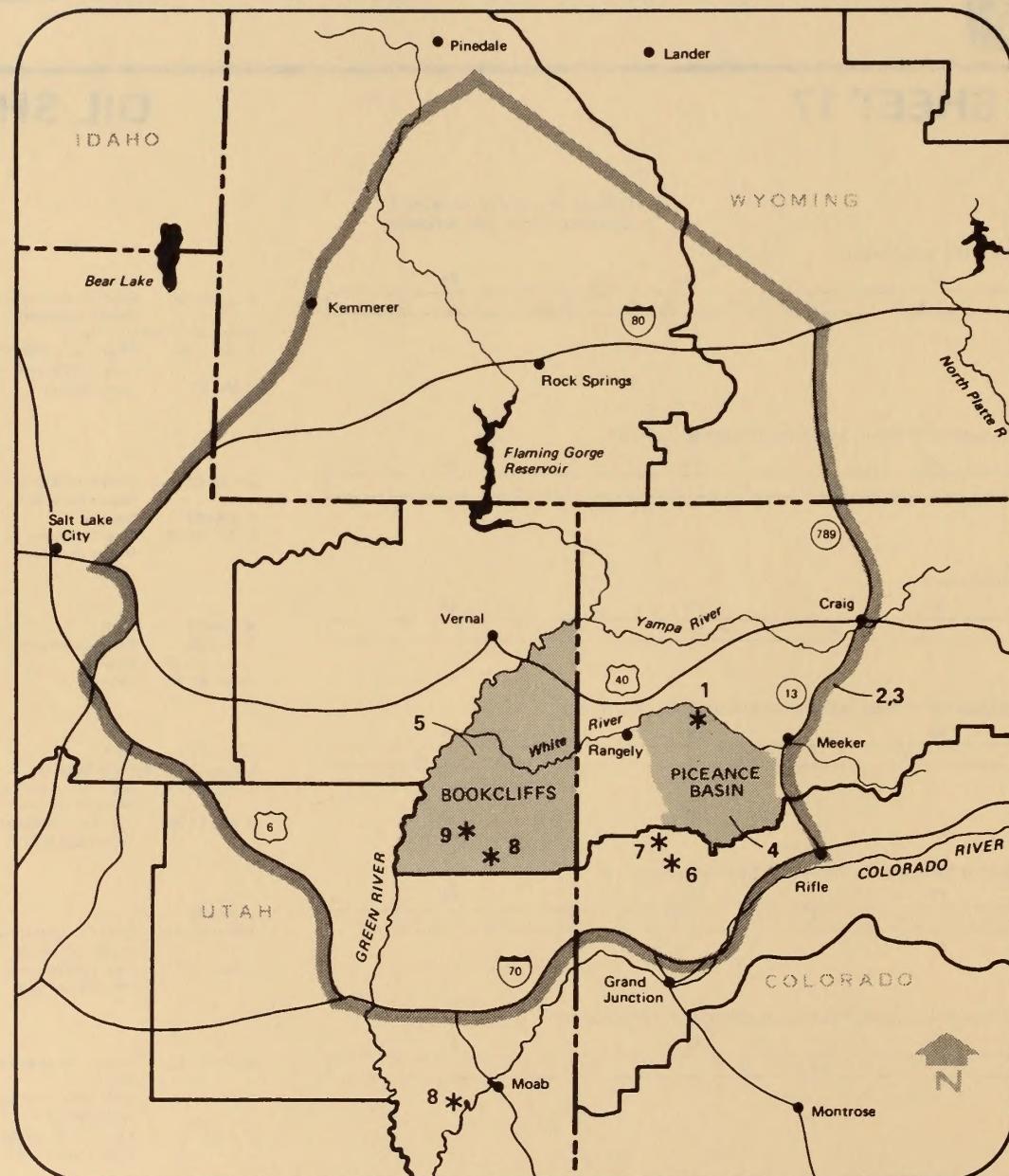
- a. Nov 82 Scoping Sessions
- b. Aug 83 Draft Environmental Impact Statement
- c. Feb 84 Final Environmental Impact Statement

#### 9. UNTAH BASIN SYNFUELS - PRIVATE OIL SHALE - UTAH

82	83	84
a b c	d	

- a. Aug 20, 82 Draft Environmental Impact Statement
- b. Sep 21-23, 82 Hearings
- c. Oct 19, 82 End of Public Comment
- d. Jan 14, 83 Final Environmental Impact Statement

(See map reverse side)



FEDERAL OIL SHALE SCHEDULE  
COLORADO, UTAH AND WYOMING

(See chart reverse side)

District Boundaries

Study Boundary



# PUBLIC LANDS RESOURCES

## FACT SHEET 18

### OIL SHALE

#### GLOSSARY

Aboveground (Surface) Retorting - Any process in which oil shale is mined and brought to surface facilities for the extraction of shale oil.

Acre-Foot - A term used to measure the volume of water that would cover one acre to a depth of one foot. An acre-foot equals 325,853 gallons. An acre-foot contains 43,560 cubic feet.

Aquifer - An underground formation, stratum, or zone that contains and yields water. A water-bearing deposit (such as a permeable sandstone) which yields a supply of water when tapped by a well or borehole. A geological formation, group of formations, or part of a formation that transmits water readily and can supply wells or springs. Also may be regarded as an underground reservoir.

Backfill - The process of refilling an excavation. This term can also refer to the material that is used to refill an excavation. To place soil, overburden, or waste rock into a surface mine excavation and to level or shape this fill material to a desired surface configuration.

Barrel of Oil - A volume unit of measurement equivalent to 42 U.S. gallons.

Boreholes - A hole prepared by a drill, auger, or other tools for exploration of strata in search of minerals for water supplies, for blasting purposes, and for releasing accumulations of gas or water. A borehole may range from an inch or so to over 12 inches in diameter, and to depths of many thousand feet.

BTU (British Thermal Unit) - The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit. One barrel of oil contains approximately 5.6 million BTUs.

C-a, C-b - Specific lease tracts on Federal oil shale lands in Colorado under the prototype program (see Tracts).

Carbon Residue - (see Residual Carbon)

Carbonaceous Sediment - Carbonaceous sediments contain organic matter that has been altered in form and composition by natural processes. Coal and kerogen are two forms of carbonaceous material.

Carbonates - Any chemical compound containing the carbonate structure  $\text{CO}_3$ . Oil shale typically contains 48 percent by weight carbonates, largely in the form of dolomite and calcite. When heated for long times at high temperatures, these carbonates decompose and combine with other minerals to form insoluble (not dissolvable) silicates. Rocks high in carbon dioxide, such as limestone, dolomite, etc.

Catalyst - Any substance, usually a solid, used to accelerate or retard a chemical reaction which itself does not undergo change during the process.

Caving - The practice of dislodging the roof of an underground oil shale mine to collapse so that it fills the mine void (empty cavity) and can be drawn out and transported to the surface or retorted in place (in-situ). (see Sub-Level Caving)

Commercialization - The process during which a research and development project is converted into a self-sustaining, profitable business.

Concessionary Leasing - A proposed alternative in the programmatic environmental impact statement which is currently being prepared. It would be based on BLM selling lease delineation rights for an area larger than the legal oil shale lease size maximum. With this area, named the "concession," a company would be permitted to delineate its own tract up to the maximum permissible acreage and concurrently acquire a lease and an approved mine plan.

Cumulative Impacts - Different effects upon the environment stemming from the sum of the existing situations and a proposed action, which may not be significant when analyzed individually, yet when analyzing two or more effects together, they produce a situation which significantly effects the environment.

Dawsonite - The mineral which is the basic carbonate of aluminum and sodium. It is a potential source of alumina, which can be converted to aluminum. The world's largest occurrence is in the Colorado oil shale deposits where it locally comprises about ten percent by weight of the oil shale.

Deep Dry Underground Mining - (see Mining)

Deep Wet Underground Mining - (see Mining)

Deposit - A natural accumulation of minerals (such as coal, iron ore, or oil shale) in sufficient quantities to encourage exploration.

Direct Retorting - An oil extraction method using direct heating of shale by the combustion of carbon, gas, and air within the retort.

Directly Heated Retorts - (see Direct Retorting)

Dry Underground Mining - (see Mining)

Dolomite Limestone - Rock composed mainly of the mineral calcium magnesium carbonate, sometimes called marlstone.

Environmental Impact Statement (EIS) - A report which is prepared in response to Section 102 of the National Environmental Policy Act of 1969 and which addresses the results of probable or suspected significant effects (impacts) on the environment. This includes an analysis of the effects on vegetation, agriculture, forage, air quality, water quality and availability, wildlife, health, social and economic concerns of the region's human population, recreation, etc. The EIS process requires formal public involvement and has a structured review process.

Exchange - A process whereby a tract of public land or resource is traded for private land or resource.

Federal Land Policy and Management Act of 1976 (FLPMA) - An Act which requires agencies managing Federal land to manage all resources on their lands on the basis of multiple use and sustained yield of resources (managing the land to get the optimum balance of use out of all the different possible surface and subsurface resources the land holds without over-use or destruction; i.e., forage, minerals, recreation, agriculture, etc.).

Federal Oil Shale Leasing Program of 1974 - A document which stipulates the regulations of the Prototype Leasing Program. This complete term is usually referred to simply as "the prototype." (see Prototype Leasing Program)

Fischer Assay - The standard method of estimating oil content in oil shale rock. A representative sample of oil shale is crushed, dried, and heated according to specifications established by the U.S Bureau of Mines and American Standard Test and Materials. The quantity of oil obtained is a measure of the "gallons-per-ton" yield or assay value. The actual amount of oil recovered from shale in any particular recovery process is expressed as a percentage of this Fischer assay value.

Great Divide Basin - A distinct geological basin located in central Wyoming which contains oil shale deposits of the Green River Formation.

Green River Basin - A distinct geological basin located in southwestern Wyoming which contains oil shale deposits of the Green River Formation.

Green River Formation - One of the richest deposits of oil shale in the world, Located in the tri-state area of northwestern Colorado, east central Utah, and southwestern Wyoming. The geology suggests the deposits were formed by trillions of microscopic organisms and inorganic sediments deposited on the bottom of vast prehistoric lakes during the Eocene times, some 50 million years ago.

Hydrocarbons - Any one of a very large class of chemical compounds composed of carbon and hydrogen and occurring in most cases in petroleum, natural gas, coal, and oil shale. The largest single source of hydrocarbons today is petroleum crude oil.

Hydrotreating - A process in which petroleum, petroleum products, or petroleum-like products are treated with hydrogen. Using a catalyst, high temperatures, and high pressure to change the molecular structure of a molecule through the addition of hydrogen. An additional benefit may be the removal of sulfur and other impurities such as hydrogen and arsenic in the process. Hydrotreatment involves passing the oil over a metallic catalyst in the presence of hydrogen; the sulphur and nitrogen are converted to hydrogen sulfide and ammonia while the hydrogen content of the oil is increased.

Indirect Retorting - A retorting method in which heat is transferred to the oil shale by gases heated outside the retort vessel. The shale does not come in direct contact with the original source of heat. Since no direct combustion occurs within the retort, a high BTU or gas is produced along with condensable oils.

In-Situ Retorting - Any process in which a section of oil-bearing shale is heated in place (in the location where originally deposited underground) in order to release oil without any significant mining of ground materials.

Kerogen - The solid, insoluble (not dissolvable) organic oil-yielding substance contained in oil shales. Kerogen is not a definite compound, but a complex mixture varying from one shale to another. When heated to above 900 degrees Fahrenheit, kerogen decomposes and separates from shale rock to yield a liquid oil, light gases, and a solid residue. Kerogen byproducts can then be converted and refined into petroleum products by destructive distillation. Diesel fuel can be made easily from these petroleum products; gasoline can be made also, but requires more upgrading.

Land Use Plans - A planning document detailing how to best manage public lands. There are two types of land use plans: A "resource management plan" and a "management framework plan" (see Resource Management Plan and Management Framework Plan).

Leaching - The separation or dissolving of the soluble (dissolvable) constituents from a rock or ore by chemical solutions or water. The removal of soluble (dissolvable) matter from rock by water.

Mahogany Zone - A layer of oil shale yielding up to 70 gallons of oil per ton. The strata of oil shale characterized by a high content of kerogen, generally the highest content of kerogen in a deposit of oil shale. It also proportionately contains a low content of saline minerals (salts). There is a definite separation between the mahogany zone and the strata above and below the mahogany zone.

Management Framework Plan (MFP) - A land use plan for using public lands which has been prepared or in progress prior to the Bureau of Land Management's planning regulations which became effective September 17, 1979. The MFP identifies goals, objectives, and constraints for a specific area in which plans are being made in order to guide future management actions and to guide more detailed project plans for specific actions effecting resources.

Marlstone - A consolidated sedimentary rock that consists of a mixture of shale and calcium carbonate. Oil shale is a marlstone.

Mineral Leasing Act of 1920 - This Act changed the status of certain minerals (coal, gas, sodium, potassium, silicates, carbonates, oil shale, etc.). Before this Act, citizens could stake a mining claim for these minerals; after the Act went into effect, the lands containing these minerals could only be leased from the government and could not be claimed any more.

Minerals Management Service (MMS) - The functions of MMS include: evaluation and classification of Federal lands for their mineral character and value, and supervision of operations necessary to the prospecting, development, and production of minerals on Federal and Indian lands.

Mine Void - An open cavity in a mined out area. Oil shale above the roof of the mine is collapsed into the mine void, filling it with fractured oil shale which can then be transported out of the mine or rubblized and retorted in place (in-situ). (see Sub-Level Caving)

Mining - Deep Dry Underground Mining - As applied to oil shale extraction, this would refer to direct mining by an underground method where little ground water would be encountered, generally at an inflow rate of less than several thousand gallons per minute. Hydrologic testing on the Utah tracts suggests that an underground mine there would generally fit this definition.

Mining - Deep Wet Underground Mining - Direct mining would be any underground method where large quantities of ground water would be encountered, generally in excess of several thousand gallons of inflow per minute for the mine working. The test mine on Tract C-a essentially fits this definition.

Mining Claim - That portion of the public mineral lands which a miner, for mining purposes, takes and holds in accordance with mining laws. The mining claim is a parcel of land containing precious metal in the soil or rock. The right to explore for, develop, and remove mineral deposits on public land under provisions of the Mining Law of 1872, as amended.

M-I-S - Modified in-situ retorting (see Modified In-Situ).

Modified In-Situ (M-I-S) - A process in which a limited amount (usually about 20 to 40 percent) of the shale deposit is removed from underground. The remaining oil shale is rubblized into the mine void and heated (retorted) in place, creating a highly permeable zone to allow circulation of air and fire to pyrolyze the kerogen and release the shale oil. A combination of aboveground and true in-situ retorting processes.

Modular Retort - A retort unit of varying size that can be added to increase overall retort capacity.

Multi-Product Production - A recovery method in which a number of different minerals from the ground are extracted at the same time (such as oil shale, sodium, alumina, nahcolite, and dawsonite) in order to get the optimum balance of use out of the different minerals the land hold. This is more efficient than mining only one mineral from the land (such as oil shale) while leaving behind other important minerals, or delaying the mining of other minerals in the ground until a later time. However, in the case of oil shale, there are only certain portions of the Piceance Basin where associated minerals are abundant enough to warrant co-production.

Nahcolite - A naturally occurring sodium bicarbonate mineral having the same chemical composition as household baking soda. It is found in high concentrations in portions of the Piceance Basin. Nahcolite is used as a scrubbing agent for industrial stacks in reducing emissions.

National Environmental Policy Act of 1969 (NEPA) - Often referred to a "NEPA" (Nee Puh), this Act, among other things, requires a Federal agency to ensure that environmental factors are given adequate consideration when the agency has a decision to be made effecting public lands. To accomplish this, NEPA requires that an environmental impact statement (EIS) be written for all major Federal actions significantly effecting the environment. The general contents of an EIS are outlined in the law.

Naval Oil Shale Reserves - President Woodrow Wilson created the Naval Oil Shale Reserve of 27,000 acres within the western oil shale region in 1916, to ensure national defense would not be jeopardized by a short supply of domestic oil reserves. In 1924, President Coolidge added 23,000 acres to the Naval Oil Shale Reserves in Garfield County, Colorado, and 4,880 acres to the Naval Oil Shale Reserves in Carbon and Uintah Counties in Utah.

Non-Renewable Resource - (see Resource)

Oil-In-Place - A resource of oil (see Resource).

Oil Shale - A layered sedimentary rock (marlstone) which contains abundant quantities of an organic material known as kerogen. When heated above 900 degree Fahrenheit, the kerogen in the rock decomposes, releasing hydrocarbon material, a liquid oil shale product, shale oil, light gases, and a solid residue.

Oil Shale Trust Fund - A Colorado State fund created in 1974 to receive revenues coming from royalties and bonuses on the two Federal oil shale tracts in western Colorado. Monies from the fund are disbursed to local agencies, school districts, and political subdivisions effected by energy development and production.

O.P.E.C. (Organization of Petroleum Exporting Countries) - A 13-nation oil cartel made up of Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela. This cartel began setting oil prices as a whole and eventually raised its price of petroleum to such a high level that serious exploration of alternative sources of energy began in the 1970's by the United States and other countries.

Open Pit Mining - A process in which the overburden, or surface, and other covering material is removed to expose beds of oil shale. The shale is then drilled and blasted.

Organic Compounds - The compounds of carbon. These fall roughly into two classes: compounds containing only carbon and hydrogen (hydrocarbons) and compounds in which one or more hydrogen atoms have been replaced by other elements or groups of elements.

Overburden - The soil and rock material that overlies a geologic deposit that must be removed before the resource can be mined.

Patent - A term used to describe the official document that conveys surface and/or underground mineral leasing rights by the Federal government to an individual or company who has complied with the law for obtaining title to the property.

Piceance Basin (Pee ahns) - A distinct geological basin located in western Colorado which contains oil shale deposits of the Green River Formation. The Piceance Basin is one of the richest single hydrocarbon deposits in the world. A 35-mile by 60-mile area in Garfield and Rio Blanco Counties in western Colorado. Here, the deposits are as much 2,000 feet thick and are estimated to contain more than a trillion barrels of oil.

Privately Owned Lands (as Opposed to Public Lands) - Lands, or interests therein, owned by individuals or companies as opposed to lands or interests therein owned by the United States or one of the States.

Processed Shale (Spent Shale) - Solid shale residue (usually called spent shale) that remains after shale oil has been removed from oil shale. (see Spent Shale)

Programmatic Environmental Impact Statement - An environmental impact statement that analyzes the effects which could result from adoption of a permanent set of program regulations. It also analyzes the different development levels for implementing a long-term Federal oil shale program. Regulations to implement the program will be prepared concurrently. The effects to the tri-state oil shale region caused by different production levels will be examined.

Prototype Leasing Environmental Impact Statement - An environmental impact statement that analyzes the effects which could result from the 1973 Prototype Oil Shale Leasing Program. It is intended to expand the range of technology of oil shale development.

Prototype Leasing Program - A leasing program begun June 4, 1971, designed to encourage oil shale development while providing for environmental protection. It is often referred to simply as "the prototype." The prototype is an experimental, trial run program. It is intended to expand the range of technology of oil shale development. It is a first attempt and subject to continual updating and changing to meet the developing requirements as the oil shale mining and retorting processes are refined and environmental control requirements are modified.

Public Lands (as Opposed to Privately Owned Lands) - Primarily, lands in the western United States that were unclaimed during the land rush days of the late nineteenth century. BLM manages these lands for all Americans, lands which include more than 85 million acres in Colorado, Utah, and Wyoming. The Secretary of Agriculture manages public lands in national forests through the U.S. Forest Service.

Pyrolysis - A chemical change brought about by heating. The breaking down of chemical bonds by the application of heat. The thermal decomposition of heavy hydrocarbon molecules to yield a lighter molecule.

Recovery Method - Generally means any system, facility, etc., devoted to extracting a particular resource from a site. It would not only include the mining method, but also any subsequent processing to render the resource marketable.

Refining - The chemical and physical process by which raw or crude petroleum is separated into its various components and chemically changed to desirable products such as gasoline and heating oil.

Renewable Resource - (see Resource)

Reserve - A resource with known location, quantity, and quality which is economically recoverable through present technology. That portion of a resource that can be extracted from a deposit and processed to yield products that can be marketed at a profit.

Residual Carbon - Carbon left in spent shale after it has been retorted. This residual carbon can then, in turn, be burned to provide heat to retort more oil shale.

Resource - A naturally occurring substance or entity with useful properties (see Reserve). The total quantity of minerals in the ground, as defined within specified limits.

Resource - Nonrenewable - Resources whose total physical quantity does not increase significantly with time. Thus, with the total initial supply being limited in quantity, each use must diminish the total stock.

Resource - Renewable - Resources whose supply becomes available for use at different intervals in time. The use of present supplies does not diminish future supplies, and it is possible to maintain use indefinitely provided the use rate does not exceed the flow rate. Renewable resources are living organisms and others, such as soil and water, which are closely associated with and effected by living organisms.

Resource Management Plan (RMP) - A land and resource plan for using public lands begun following the Bureau of Land Management's planning regulations which became effective September 17, 1979. The RMP identifies goals, objectives, and constraints for the specific resource area in which plans are being made in order to guide future management actions and to guide more detailed project plans for specific actions effecting resources. The RMP and an associated environmental impact statement are published in draft for public comment and are subsequently issued in final form. The resource management plan establishes in a written document: land areas for limited, restrictive, or exclusive use; specified defined limits of resource use; allowable resource uses; related levels of production or uses to be maintained; program constraints and general management practices; resource protection provisions; etc.

Retort - Any closed vessel (oven) or facility for heating a material in shale oil operations. The vessel or container in which the kerogen in oil shale is pyrolyzed to recover shale oil.

Retorting - The process by which a material, such as oil shale, is heated to pyrolysis temperatures of 900 degrees Fahrenheit or more to extract the kerogen contained in the rock.

Retort Plant - Commercial Scale - A commercial size oil shale facility would use several retorts running parallel to obtain desired production rates.

Retort Plant - Pilot Plant Scale - A single unit about one-hundredth of the capacity of a commercial scale module.

Retort Plant - Pioneer Commercial Scale - Would contain several commercial size modules.

Retort Plant - Semiworks Scale - About one-tenth of the capacity of a commercial size facility.

Room and Pillar Mining - An underground mining technology in which some of the oil shale deposit is removed from underground rooms for aboveground retorting, and some of the deposit is left standing in place, creating a series of rooms with pillars of unmined rock left standing between mined out areas of the room to support the mine roof. These pillars may be partially removed later during withdrawal from the mine.

Rubblizing/Rubblization - The process of breaking large, solid materials into rough, broken stones. As applied to oil shale technology, the process in which the shale within a given volume is explosively fractured into a mass of small pieces in preparation for retorting.

Salines/Saline Minerals - A variety of chemically formed rocks characteristically containing salts. As used by Congress, includes all salt lands of every character.

Sand Wash Basin - A small distinct geological basin located in north central Colorado which contains oil shale deposits of the Green River Formation.

Shale Oil - The liquid oil extracted from oil shale by heating oil shale rocks. Shale oil is a synthetic crude oil resembling conventional petroleum.

Silicates - Any of a large class of minerals containing silicon, oxygen, or one or more metals. Typical oil shale contains 35 percent by weight silicates in the form of illite, albite, and K-feldspar.

Site-Specific - In the context of "land use planning" this term is used when referring to only a certain parcel of land (for oil shale, generally 5,120 acres). The term also applies to studies obtaining information, impacts, etc.

Spent Shale (Processed Shale) - The material remaining after oil and gas products are removed by retorting; properties vary with the type of retorting procedure used. Indirectly heated retorts produce a carbonaceous spent shale; directly heated retorts, largely eliminate carbon residue (sometimes called processed shale).

Strata - Layers of sedimentary rock.

Stratum - A layer of sedimentary rock.

Strip Mining - The mining of oil shale by surface mining methods as distinguished from the mining of one or more different ores by underground mining methods; commonly designated as open pit mining.

Sub-Level Caving - To rubblize or fracture oil shale and let it fall into a "mine void" (see Mine Void), or filling the mine void with oil shale which can then be transported out of the mine to be retorted or can be rubblized and re-torted in place (in-situ). (see Caving)

Surface Mining - (see Open Pit Mining)

Surface Retorting - (see Aboveground Retorting)

Sweet and Sour Crudes - Oil is classified according to its sulphur content. "Sweet" crudes are those with little or no sulphur content. "Sour" crudes contain quantities of sulphur or sulphur compounds which cause the oil to smell sour (usually over 1.5 to 2.0 percent by weight of sulphur).

Synthetic Crude Oil (Syncrude) - A substance produced by adding hydrogen to crude shale oil, comparable with the best grades of conventional crude oil.

Synthetic Fuel (Synfuel) - Any direct substitute for conventional petroleum fuels. Liquid petroleum-like fuels derived from any so-called "unconventional" non-petroleum sources such as coal, oil shale, tar sands, agricultural products or municipal-solid wastes.

Synthetic Fuels Corporation - Created by the Energy Security Act to meet synthetic fuel production goals. The corporation was designed to offer loan guarantees, price supports, and purchase agreements to developers of commercial-scale synthetic fuel projects.

T-I-S - True in-situ retorting (see True In-Situ).

Tracts - Specific parcels of oil shale land owned by the Federal government which are offered for leasing. Tracts in Colorado are identified with - C, Utah - U, and Wyoming - W (i.e., C-a, C-b, U-a, U-b, W-a, W-b). Size limitation of oil shale tracts may not exceed 5,120 acres. Two Colorado tracts (C-a and C-b) and two Utah tracts (U-a and U-b) of approximately 5,120 acres each were offered for lease and were leased by the Department of Interior in 1974 under the prototype program. Two other tracts in Wyoming (W-a and W-b) were offered for lease at the same time as the Colorado and Utah tracts, but no bids were received to lease them.

True In-Situ (T-I-S) - An oil production process in which the oil shale is heated (retorted) where it occurs in the ground, and kerogen oil is drawn off through wells and then up to the surface.

Trona - A hydrated mixture of sodium carbonate and sodium bicarbonate. Trona is a source of soda ash for glass production and found primarily in the Green River Formation in Wyoming.

U-a and U-b - Specific lease tracts on Federal oil shale lands in Utah (see Tracts).

Uintah Basin - A distinct geological basin located in eastern Utah with a small portion of the basin extending into western Colorado which contains oil shale deposits of the Green River Formation.

Upgrading Facility - A plant which refines and upgrades crude shale oil by removing impurities (see Refining).

Uplifting - As applied to oil shale, this commonly occurs over shallow buried shales prepared for true in-situ production by explosively fracturing and rubblizing the shale strata. The resulting void space about each fragment of rubblized shale is obtained by uplifting the surface over the area rubblized.

W-a and W-b - Specific proposed lease tracts on Federal oil shale lands in Wyoming (see Tracts).

Washakie Basin - A distinct geological basin located in southwestern Wyoming which contains oil shale deposits of the Green River Formation.

Wet Underground Mining - (see Mining)

White River Resource Area - An administrative unit of the Bureau of Land Management, Craig District, located in Meeker, Colorado.





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